



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>



26596. r. 20

MOTION:
ITS ORIGIN AND CONSERVATION

MOTION :

ITS ORIGIN AND CONSERVATION

An Essay

BY THE

REV. WALTER McDONALD, D.D.

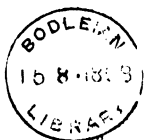
PREFECT OF THE DUNBOYNE ESTABLISHMENT, ST. PATRICK'S COLLEGE, MAYNOOTH

DUBLIN :

BROWNE AND NOLAN, LTD., NASSAU-STREET

LONDON : BURNS AND OATES, LTD.

1898



Ἔστιν ἡ κίνησις ἐν τῷ κινητῷ· ἐντελέχεια γάρ ἐστι τούτου, καὶ ὑπὸ τοῦ κινητικοῦ. Καὶ ἡ τοῦ κινητικοῦ δὲ ἐνέργεια οὐκ ἄλλη ἐστί.—Aristotle, *Phys.*, Lib. 3, cap. 3.

"Actio et passio et motus sunt una et eadem res."—St. Thomas, *Opusc.* 68, tr. 5, c. 7; et alibi passim.

"All energy is kinetic energy, the energy of motion."—Prof. G. F. Barker.

Nihil Obstat :—

LUDOVICUS J. HICKEY, O.P.,
Censor Deputatus,

Imprimatur :—

✠ GULIELMUS,
Archiep. Dublinensis,
Hiberniae Primas.

CONTENTS.

CHAP.	PAGE
I. INTRODUCTORY	I
II. TEACHING OF ARISTOTLE	16
NOTE—Teaching of St. Thomas Regarding the Perseverance of Individual Motions	38
III. ST. THOMAS	42
NOTE—On the Nature of Sacramental Activity	62
IV. ST. THOMAS (<i>continued</i>)	64
V. THE COUNCIL OF TRENT	81
VI. THOMISTS AND MOLINISTS	94
VII. THE MODERNS	124
VIII. AGENTS, OCCASIONS, AND CONDITIONS	152
IX. CONTINUITY	182
NOTES—I. St. Thomas on Transient Actions	202
2. Aristotle and St. Thomas on the Subject of Transient Actions	204
X. RESISTANCE	208
NOTES—I. Action of Material Fire on Spiritual Substances	243
2. Resistance offered to Matter by Pure Space	246
XI. ATTRACTION	248
NOTES—I. The Ancient Physicists on Attraction	267
2. The Density of Ether	273
XII. PRODUCTION OF FORMS; ACCIDENTS	276
XIII. PRODUCTION OF FORMS : SUBSTANCES	299
XIV. ACTION AND MOTION	327
NOTE—Is Transubstantiation an action?	336
XV. VITAL ACTIONS	338
XVI. FREE-WILL	365
XVII. THE PRIME MOVER	386
NOTE—The Existence of God Proved by the Phenomena of Resistance	418
XVIII. THE ORIGIN OF MECHANICAL MOTION	420
NOTE—On the Original Forms of Mechanical Motion	447

PREFACE.

My object in publishing the following Essay is, in the first place, to vindicate for myself and for Catholic professors generally the right to teach in accordance with the kinetic theory of activity, whatever may be the science on which we are engaged,—Physics, Metaphysics, Theology, or anything else. The physical constitution of activity is, in my opinion, of fundamental importance in every science which is not purely mathematical. All other sciences deal with specific differences, the tests of which are specifically distinct actions, which themselves are to be differentiated by means of their objects or terms. But how is it possible to differentiate either actions or their terms or objects, unless one has a well-defined and accurate idea of the physical realities which one is to classify?

Every student of Theology is aware of the confusion that prevails even in the works of some of our greatest writers, in connection with such questions as the action of grace in the soul, virtues and vices with their specific distinctions, activities, and effects, the manner in which the different sacraments operate, and other questions of a similar character. An experience of many years as a professor and student of Theology has left me under the conviction that most of this confusion arises from the fact that writers on these subjects have very vague ideas as to the nature of specific difference, and above all, as

to the precise constitution of the realities in which the tests of this difference—actions and their objects—properly consist. In the course of the Essay I have given illustrations of this,—in connection with occasions and indirect causality, transubstantiation, resultance, and free-will ; similar and much more effective examples might be taken from other parts of Theology.

It is necessary, therefore, first of all for the student of any science which deals with the natures and activities of creatures, to get a correct and definite notion of the physical essence of the action of the particular species which is to form the subject of his study ; and also to ascertain as definitely as possible what is the nature of activity in general. And this reminds me of another object which was often before my mind when writing the Essay,—the importance of physical science for the metaphysician and the theologian. There is a well-known axiom in the Scholastic Philosophy, to the effect that all our knowledge comes to us through the senses. The intellect acts on the phantasm precisely as this is found in the organ. If the impressions which material objects make on the senses be erroneous, one will never be quite right in one's metaphysical or ethical notions. Just as he who wears green spectacles sees all things green ; so if we look on the world with minds colour-blinded, so to speak, by errors in the physical sciences, assuredly our Metaphysics and, as a consequence, our Theology, will be proportionately at fault.

This brings me to the only other point to which I wish

to call attention here. There is no denying the fact that the *Physics* of the Schoolmen is very incorrect in many particulars. But it is impossible to err in *Physics* without proportionate error in *Metaphysics* and *Theology*,—at least if one has any tendency to be consistent, as the Schoolmen undoubtedly had. Hence we may be sure that every advance in physical science will lead to proportionate development in *Metaphysics* and *Theology*. If this be so, it follows that it is a mistaken view of the duty of a theologian, to suppose that he should first of all endeavour to ascertain what the Schoolmen may have taught on the question he is studying, and that he should be prepared, for his own part, to propound in the face of modern physical science whatever he may find to have been received commonly two or three hundred years ago. If this were the duty of a theologian, we should still be bound to defend the Ptolomaic system of Astronomy, the Aristotelic system of chemical elements, and the geological notions that prevailed in the Middle Ages. And what I wish particularly to bring under the notice of the reader is, that on these questions it is not only our Astronomy, or Chemistry, or Geology, that has been amended, but the *Metaphysics* and even the *Theology* that are connected with and in part derived from these portions of physical science.

I must not be understood by these observations to endorse the charge which has been made so often in modern times by those who know next to nothing of the

Philosophy of the ancients, to the effect that their Physics was *all* erroneous, and that as a consequence, their Metaphysics must have been equally in error. No one who reads the following pages with even moderate care, will remain under the impression that such is my meaning. I have over and over again taken occasion to point out that in the physical sciences, so far as these constitute a Philosophy in the true sense, and are not confined to mere experiments, the tendency of the ablest masters now is to revert to the theories of the ancients,—modified, indeed, and corrected in many of their details. But while I yield to no one in respect for the old masters of the Peripatetic schools, especially those who lived in the period that preceded the Council of Trent, I do not pretend to be so devoted a disciple as to be blind to the many defects which have been brought to light by modern physical methods. Nor have I so much regard for the speculations of the ancients as to feel justified in continuing to propound theories, either in Physics or Metaphysics, which have been proved by modern instruments of research to be contrary to fact, merely because these theories were at one time commonly received in the Catholic schools. In all this I am referring only to the philosophical speculations of the scholastic theologians, and not by any means to doctrines proposed authentically by ecclesiastical authority, nor above all, to what is contained in the body of revealed doctrine.

I will only add that I have not the least pretension to be regarded as a physicist, and should not be at

all surprised if those who have a right to be so regarded were to find what they will look upon as blunders in the following pages. I do not think, however, they will find more of these than metaphysicians can point out in the philosophical speculations to which scientists are wont to treat us. And I hope that any blunders I may have made, will not, like too many of theirs, be found to have an important bearing on the essential philosophic principles with which I propose to deal.

MOTION:

ITS ORIGIN AND CONSERVATION.

CHAPTER I.

INTRODUCTORY.

It is commonly admitted, and will be taken for granted in the following Essay, that there are at least two distinct things objectively existing in the world,—Motion and something which is moved. This something is by many called Matter or Mass ; I prefer to designate it by the more universal term, Substance,—the thing that underlies (*sub-stans*) and sustains phenomena.

With regard to the first reality, Motion, simple as the idea may appear, it will be found in Catholic philosophy to embrace more than in the writings of modern physicists. In every school the generic idea of motion is one of continuous change. The disciples of Aristotle teach that material objects may change continuously either in regard to their place, or their size, or their qualities,—such as figure, heat, colour, &c. Hence three kinds of motion are recognised in the Aristotelic system,—change of place (*translation*), of quality (*alteration*), and of quantity (*increase* and *diminution*).

By the word “ Motion,” as it appears in the title of this Essay, I understand change of place merely. My reasons for thus limiting the subject of inquiry are principally two. In the first place it seems advisable to confine our attention to the same object precisely to

which modern physicists have devoted so much study. Moreover, inasmuch as, according to the Catholic writers themselves, alteration, increase, and diminution, are dependent on change of place ; whatever produces them or keeps them in existence, must do so by causing local motion and keeping up the same. Hence even in the Catholic system, local motion alone of the three species is of fundamental importance ; and it is well that it should be studied separately, especially as the scientific men whom we shall have to consult do not take the other species into account. I should like, if it were possible, to abstract altogether from the other two forms of motion ; it cannot be, however, as arguments drawn especially from change of qualities will have to be considered.

I.

It is quite conceivable that a substance should be utterly motionless ; for aught we know, matter may exist somewhere in this state of absolute repose ; but, apart from the divine nature, we have no knowledge of any such motionless reality. Everything in the world is agitated—by light, heat, magnetic and electric forces, gravity at least ; what is not moved in some way cannot reveal itself to our senses. The very Sphinx, symbol of utter immobility, is, as we learn from Physics, one seething mass, currents and counter-currents ever crossing one another in endless variety within its flinty surface. I am not concerned just now with pure or with disembodied created spirits ; though of them also in their measure the general statement may well be true.

But though nothing ever begins to move, in the sense of passing into movement from a state of absolute repose, yet is motion said to *commence* whenever it is

intensified. A billiard-ball lying apparently at rest on the table, is not without its wave-disturbances ; neither is the cue motionless as it stands on the rack, nor the player seated on the bench. When he takes the cue, and strikes the ball, he but adds to the motions that already existed in all three. In that sense only are they said to begin to move.

It is this increase of motion with which I purpose to deal in the first place ; I hope afterwards to draw some important conclusions regarding the ultimate source of all movement, as well as with respect to the means whereby motion is kept up after being brought into existence. Accordingly, the first and main question for consideration is, how precisely an increase of motion is brought about.

I am writing principally for Catholics, and shall take for granted many things that will not be admitted by those who differ from our creed, especially by those who do not believe in the spiritual or in the supernatural. If any such should come across these pages, they will find arguments which for them will have no weight. Let them be content, if they can, to read ; that they may, at least, be able to judge whether the Catholic system is consistent, and how far it fits in with the teaching of physical science. They will, I hope, meet here and there with arguments based on premisses admitted by all ; and they may get new lights in any case with regard to matter and its accidents, by looking at them from the point of view of the Aristotelic philosophy.

II.

With regard, therefore, to the origin of the increased motion in the billiard-player, the cue, and the ball, I believe the following will be admitted to be a fairly

correct representation of the view commonly held in the Catholic and other schools :—

1. First with regard to the increase in the player. His motion is of the kind that is known as vital ; it arises spontaneously within himself. It is caused by what is called *power*,—something quite different from the man's substance, and existing antecedent to his movements.

Power is of two kinds. One is always present in its subject, even when this is at rest ; as we have the power of speech when we are quite silent, the power of walking when sitting still. The second kind of power is represented as an actual exertion of the first,—an emanation of something from the former, that causes motion, and lasts just as long as the movement thus produced. Power of the first kind is technically known as *habitual*, of the latter species as *actual* ; habitual powers are also called *faculties*. I think it is actual power only that is usually denominated *force*.¹

How “ force ” contrives to produce motion, I do not

¹ I should not be surprised if many were to find fault with some of the statements in the text, especially that regarding “ force.” The following extract may not be irrelevant :—

“ There is widespread confusion and error as to the meaning even of so simple and elementary a term as ‘ force.’ The reader will often find it used indifferently in either of two senses which have no connection whatever with one another : and unless he completely gets over this abuse of language, he need not hope to be able to follow the present portion of our preliminary argument. Force proper is a pull, push, weight, pressure, &c., and can be measured, in the vernacular of engineers, as equivalent to so many pounds weight ; but the unjustifiable use of the word applies it to *work done by a force*, so many pounds raised so many feet, *i. e.*, *force overcome through a space*. Two such things are of different kinds, and cannot possibly be compared together. They differ, in fact, in precisely the same way as length or breadth differs from superficial area, *i. e.*, as a linear foot differs from a square foot. And the modern use of the word is more outrageous alike to science and to common sense, than would be the attempt to assign the height of a mountain in acres. For the absurdity

find more definitely explained; this much is admitted by all Catholics,—that it does not act alone. God also is at work, either immediately or through some quality (force?) which He infuses into the player while the motion lasts. This action of God's is said by some to be prior to that of the man's own "force;" while others would have it that both are concomitant,—quite simultaneously contributing to the one motion, which is thus produced equally by both.

The reader must not be dissatisfied with any want of definiteness and lucidity, or even with any confusion he may notice in the preceding paragraph. The teaching I find on the subject is neither lucid nor definite; above all it is not unanimous, to say the least. This much I believe to be held commonly by Catholics, that the motion is produced equally by two agents,—the human and the divine; that both of these are equally active in the very first instant of the production and existence of the movement; that the substance of the human agent does not act immediately, but through a faculty or

does not end even here. We have, as yet, absolutely no proof whatever that force proper has objective existence. In all probability there is no such *thing* as force (which is suggested to us by the impressions of our muscular sense), any more than there is such a *thing* as Sound or Light, which are mere names for physical impressions produced upon special nerves by the energy of undulatory motions of certain media. The term, however, is a very convenient one for the rate of transference or transformation of energy per unit of length in a given direction." (B. Stewart and P. G. Tait, *The Unseen Universe*, p. 104.) The italics are the authors' own.

The reader will not fail to observe how the writers of the foregoing extract, after complaining of "widespread confusion and error" as to the meaning of the term "force," themselves go on to supply not a bad illustration. "Force proper is a pull, push, weight, &c." Yet "in all probability there is no such *thing* as force;" as if a pull or push were not a "*thing*!" Moreover, force, sound, light, &c., "are mere names for physical impressions produced,"—by the energy of undulatory motions of certain media. Is it, then, "the energy of the undulatory motions," or "the physical impressions" produced thereby which we call "forces"? In either case is force not a "*thing*"?

habitual power ; that this faculty is often quite inactive and quiescent, and produces motion by giving out a further reality which is called "*force*," and that "*force*" is conceived to be as distinct from the resultant motion, as it is from the faculty from which it emanated, and from the substance itself.

There are thus four really distinct entities :—the substance of the player, his faculty of moving, the actual "*force*" which he exerts while in motion, and the movement that ensues.

Moreover, whereas there is but one motion produced,—that in the player (we are considering it as it is in him before the cue has begun to move),—there are two substances, the human and the divine ; one faculty, the human only ; at least one "*force*," that which emanates from the faculty ; and probably also another "*force*," infused by God, to combine with the energy emanating from the faculty, for the production of the one resultant motion.

2. So far for the vital movement of the player. By means of it he moves the cue, and this in turn moves the ball. How is the motion caused in both of these ?

(1) One thing is certain, according to the opinion I am explaining : the motion itself does not pass from one agent into the other. It is not the motion of the player that is communicated to the cue, without change of individuality ; nor does the motion of the cue, remaining the selfsame, pass into the ball. The motions of all three are different individuals, each being the immediate effect of something that is not motion at all, but "*force*."

How, then, does the "*force*" act ? I am not sure that here I can give any statement that will exactly represent the views of all who hold this opinion.

(a) "Force" passes from the player into the cue. It seems to unite there with another "force" that is at the same instant exerted by the wood, and both combined cause the motion of the cue. When the cue touches the ball, the combined "forces" of arm and wood pass into the ivory, unite there with the "force" of the new substance, and thus all three together cause the motion of the ball.

(b) Or is it that the player's "force" alone causes the motion of the cue, uniting thereby with the "force" of the wood, and passing into the ivory, in which the motion would thus be caused by a double and not by a triple "force"? I think I have found both explanations, according as the motion of the agent itself or of the object acted on, is considered to be the effect immediately produced. Is the cue the efficient cause of its own motion? Then the "force" of the wood must have combined with that of the player before the cue could have begun to move; for, an efficient cause acts by exerting its "force." If, on the other hand, the immediate effect of the cue is not its own motion but that of the ball, there is no reason for supposing that the "force" of the wood is exerted until after the cue has been moved.

(2) These are mere details, introduced here lest advocates of this system should complain that their opinion is not stated fairly. It does not make very much matter, as far as my immediate purpose is concerned, how these points are settled; nor need the reader be very anxious to grasp them, or to bear them in mind. Let him get a clear conception of the main features of this great system, which are :—

(a) That motion does not pass from one agent into another without losing its individuality, but is produced *de novo* in every object that begins to move in the sense explained.

(b) That the immediate efficient cause of motion is a reality called "force," which is thus quite distinct from motion as well as from faculty and substance.

(c) That this "force" emanates immediately from an habitual ever-present power or faculty, which itself is sustained by the substance;¹ and that the "force" so exerted passes from one agent to another.

(3) It is necessary to bear in mind that the player cannot act alone, for all his faculties and "forces," but needs the divine co-operation,—as Catholics, at least, believe; and the same divine concurrence is equally required throughout. It enters into the cue with the "force" of the player; and when the ball acts, the divine activity also is exerted. There are not two motions in any one agent; but two agents, and probably also two distinct "forces," co-operate in producing every movement that anywhere exists.

III.

Now I have the hardihood to believe that there is another side to this question: that some of the very ablest of the old Catholic writers on philosophy, and many of the moderns who are not Catholics at all, have taught and are teaching an opinion regarding the cause of increased motion, very different from that which has been explained.

1. This second opinion has at least the merit of simplicity. Those who defend it think that there is no such thing as "force," really distinct from the permanent faculty and the motion which is caused therein. The motion of the faculty is itself the only force, activity,

¹ Some Catholics have adopted the principles of Descartes, so far as to deny the existence of faculties really distinct from substance.

action, formal cause of efficient causality. And motion passes quite readily from one agent into another without losing its individuality.

The divine co-operation is thus reduced to the original production and perennial conservation of motion. Created substances and faculties were in the first instant utterly quiescent ; all the motion they have ever had was infused into them by God. They were absolutely incapable of moving till He *pre-moved* them ; till then they were capable merely of receiving movement from without. Motion once received by a creature, is kept and owned by its subject, as long as God, who gave the motion, conserves it in existence ; and as long as the subject into which it has been infused does not transmit it to another.

In other words, motion is to the faculty what the faculty itself is to the substance, with two points of difference :—(a) That one is motion, the other a quality capable of sustaining motion ; and (b) that the quality is fixed to its substance, whereas in many cases the motion can pass from subject to subject. The substance is produced by God, and kept by Him in existence ; so is the faculty, and so too is the motion. The substance is God's, in the sense that He made it, conserves it, and owns it ; yet is it its own, too, in this sense, that it is a *supposit* apart,—a thing rounded completely, whole, and in a certain sense independent, in itself. The faculty is also God's, in the same sense as is the substance ; He made it, set it and keeps it in its place. It is not its own, in the sense in which a substance is its own ; the faculty belongs to the substance, which truly sustains it, has it, is the independent whole to which it belongs.

And so every movement that exists is God's movement : He produced it originally, infused it into its subject, and keeps it there by an unceasing act of

production. It is also truly the creature's, just as the faculty is ; not because it was produced by any "force" within the creature, just as the faculty was not so produced ; but because, as the faculty is sustained by and belongs to its substance, so the motion is sustained by the faculty, held there and owned by the independent *supposit* that owns the faculty and all it has or holds.

There is one difference between the faculty and its motion, in relation to the immediate subject of both,—an essential difference. Both are forms, and, therefore, formal causes. The faculty, being a faculty, is the formal cause why the *supposit* is capable of action,—active *in actu primo*. The motion, being not a faculty but an action, as it is contended, is the formal cause why the same *supposit* is formally active *in actu secundo*,—or *acting*, as we say. In other words, the formal reason why any created being is *capable of acting*, is because it has a faculty capable of receiving motion. But the formal reason why it is *acting* efficiently,—causing or producing new figures, locations, or forms of any kind,—is because it is actually endowed with motion, which is the same as action. It is thus moving or acting ; and the new figure, place, or other form produced, is the term in which for the moment the motion results.

Creatures are thus truly active, efficient causes,—a point on which I cannot insist too strongly ; their action, however, is not theirs only, but is also God's. Not as if there were two actions, one divine and the other human ; or two faculties or powers of any kind ; there is but one motion, which is sustained in the one created faculty and substance, but which was put there originally by God alone, and is kept there continuously by Him. The action of the creature is thus the operation of God in the

creature,—a point of the greatest importance in the philosophy of St. Thomas.

A remark just made calls for explanation—to avoid misapprehension. When it is stated that God alone puts motion into a faculty, and keeps it there, it must not be understood that creatures do not transmit their motions to one another, or even from instant to instant within themselves. Motion passes—is transmitted—from instant to instant within every moving creature, and often, as has been said, is handed on without losing its individual identity, from one subject to another. The efficient cause of its inception was God only, and not the creature; but the latter, being once endowed with motion, can pass it on either within itself or to an external object. If, however, creatures can thus transmit motions, they can do so only with regard to those which have been already put into them, and kept there by the divine activity. One can keep a sovereign in one's purse or give it away, only after the coin has been created and kept in existence by the act of God. Let the creative act once cease, and it becomes impossible either to keep the sovereign or to give it to another.

Briefly, the motion at its inception does not come out of any "force" in the faculty; it is infused by God. And if, being once infused, it may be transmitted in succeeding instants, this is altogether due to and consequent on the fact, that the motion has been not only produced at its inception and infused into its subject by the power of the Prime Mover, but has been kept in existence by a perseverance of the same productive act.

2. Applying all this to our illustration taken from the billiard-player, let us see how the various effects are produced. Above and before all it must be remembered that the player is quite active;—*in actu primo*, inasmuch

as he has the faculty of receiving, possessing, and retaining, the divine motion; and *in actu secundo*, because the motion thus received and retained is the very formal cause by reason of which he moves and acts.

(1) Commencing, then, with the vital motion in the player, it does not come to him in the first instant from himself, even in part. It was wholly infused into him by a previous motion on the part of another agent,—which in all cases of vital motion is God alone.

This previous motion is known in the Catholic schools as the *praemotio physica divina*. It is *previous* only by what is known as an instant of *reason*, not of *time*; that is, it never really existed as an actual motion outside the human subject,—which might thus receive it from without, as a ball receives motion from a cue. There can be no real motion in God, who is absolutely immovable. Yet God as really infused that motion into the player, vital though it be, as if He first produced it in some other creature, from which He might transfer it to the living man. The divine motion is thus truly *previous* to that of the creature, and yet it exists for the first instant of its reality as that very motion of the creature, which is therefore consequent on, yet coexistent with, the *premotion* of God.

In the very same sense the human soul must exist before it can be infused into the body (*prius est esse quam infundī*), yet it really exists for the first time when it is actually infused. The same is true of every form that is infused *de novo*, the instant of priority being one of reason, not of actual time.

The vital motion once infused into the billiard-player lasts its time—all the time during which the player moves vitally. By these motions he is the efficient cause of many changes in his own figure, position;

and other qualities and relations. The motions are the reasons, and the only reasons, why these changes result.¹

(2) Motion passes from the player to the cue,—really *passes*,—remaining the selfsame movement that had been in the player's arm ; whether it is the vital motion that passes or another, we shall examine later on. Thus we have what is known as a *transient* motion or action,—an *influence (in-fluxus)* from the human arm into the wood. Now, when *something flows from one agent into another* to get a new term there, we have the very essence, physical and metaphysical, of true efficient causality. There is a new location produced for the cue ; slight changes of figure, heat, colour ; electrical, chemical, and other qualities ; all of which new terms must of necessity result whenever certain motions pass into the wood from the player's arm. You see how efficiently active the man is in relation to these results.

(3) From the cue the motion passes into the ball, and similar changes are produced in it. From the ball it passes into the table, into the earth, into the atmosphere, into many things and in many shapes,—as of heat, electricity, chemical action,—who shall reckon them ? It *passes*, but never *ceases* to be ; there is no stopping, as far as we are aware, of mechanical motion once begun ; not, at least, without a special intervention on the part of God.

(4) Thus, there is no “force” but motion, which is all-sufficient as activity, being the very formal cause of the *actus secundus*. Neither is it necessary that God should further interfere than by infusing motion in its first instant, and afterwards continuously keeping it in being. He does everything, produces everything, even immediately ; there is not in the world the

¹ See, however, c. 15, ii., iv.

tinest of movements, or of other realities, that He does not keep in existence. He is thus the immediate cause of everything, as the axiom says: "*immediatione virtutis non immediatione suppositi*,"—by an immediateness of power, but not of *suppositi*. It is this power, activity, action, motion, that does everything: a power or motion, however, that is subjected in the substance of creatures, and not in Him.

IV.

These are the two theories of activity between which you are asked to decide. I shall call them respectively throughout this Essay the *Dynamic* and the *Kinetic* theories, though these terms are often used in a somewhat different sense.¹ I have filled in the details of both systems with some minuteness, and still have to treat many of them much more elaborately, as the argument proceeds. The main question, however, is quite simple and easily borne in mind. When the amount of motion is increased in a subject, how does the increase arise? Must it always be produced *de novo*; or may it *pass* from subject to subject? When it begins for the first time, as in the case of vital actions, is it caused by a "force" existing previously within the vital faculty, or is it altogether *infused* into the faculty by God? In a word, is there at all such a thing as "force," really

¹ The term, *Dynamic*, is a Greek word, usually applied to the theory of Boscovitch, according to whom the ultimate elements of matter are particles of "force" (*δυνάμεις*.) In this Essay the term designates the opinion of those who maintain that there is in nature such a thing as "force," really distinct from and productive of motion; even though they should hold at the same time, as they usually do, that "force" is really different from matter as well. The word, *Kinetic*, also, is of Greek origin (*κίνητικόν*), and means moving, movable, or producing motion. The Kinetic theory is often designated as "Mechanical." I do not see how it is more mechanical than is the theory which is based on "force."

distinct from, and midway between the faculty and its motion ; or is the motion of the faculty, in reality, the same thing that is often called force ?

I have made my choice. I believe that there is no "force" intervening between the faculty and its motion ; that, consequently, every movement at its inception, neither is produced by, nor proceeds from the "force" of a faculty, but is generated in its first instant by God, and infused into the creature solely by Him. I am convinced that once infused in this manner, motion may, without losing its individuality, pass on from instant to instant, and from subject to subject ; and that all the mechanical movements of matter are thus communicated from one body to another, and must continue for ever, unless stopped by a divine intervention akin to the annihilation of substance itself.

Above all, I believe that creatures are true efficient causes, producing effects by the influences they exercise not only within themselves, but on one another by means of *transient actions*. I am convinced, however, that this *fluxus* or *passage* is of motion, and of it alone ; as there is nothing else that could flow or pass, unless force, which, as has been said, is but another name for motion.

This, I hope, is a sufficiently definite statement of opinion, such as can be easily understood and remembered. It is not my opinion only, but was taught, as I believe, by some of the very greatest Catholic philosophers of the Middle Ages, and is held by some of the very ablest of the scientific men of our own day. I think it will be found to be based on reason and common sense, whereas the rival view is full of inconsistencies. It will be seen from the following chapters whether I can make these statements good.

CHAPTER II.

THE TEACHING OF ARISTOTLE.

I.

THE reader will pardon me if I repeat that the question at issue is, not whether there is in the world such a thing as force; but whether the force which undoubtedly is to be found everywhere, is anything really different from motion. Accordingly, if it should happen, as it will, that when glancing into the treatises left behind them, whether by the ancient philosophers, or by the moderns, one should come across such words as force, energy, virtue, and their equivalents in whatever language the idea may be conveyed; one should not cry off-hand that the question is settled, as far as any matter in dispute can be decided by weight of authority. One should rather pursue the inquiry so far as to ascertain what precisely those great teachers mean by the words they use. I also admit, and most strenuously contend for the existence of force. Someone has observed most justly that "there is not a leaf rotting on the highway but has force in it; how else could it rot?" But, as in this Essay of mine the word force does not mean anything really different from motion, possibly the same is true of what one reads in the pages of others.

Whoever has got even a little training in the principles of Catholic philosophy, will not need to be told why Aristotle should be the first witness called in an inquiry of this kind. According to the tradition of our schools, he has been regarded, since the time of St. Thomas, as The Philosopher *par excellence*; his writings have been quoted by the Angelic Doctor and his disciples, almost with as much reverence as Holy

Writ, or the decrees of general councils ; his authority in philosophical matters has been much greater than that of any of the Fathers on questions of Theology, with perhaps the single exception of St. Augustine on Grace. If, therefore, it should appear that the Stagyrice favoured the kinetic rather than the dynamic theory of activity, there can be little reason to doubt that Catholic philosophers of the present day are quite justified in advocating the same opinion. And inasmuch as Dynamists are wont to contend that the kinetic theory is not only *false* but *uncatholic*,—to secure liberty of opinion on the point is no little matter.

Apart, however, from this question of liberty of opinion, and regarding the controversy from the point of view of truth alone, it seems to me of the very greatest importance to learn what was the mind of Aristotle on a point which is so mixed up with Physics and Metaphysics. For, unless the Catholic system of philosophy be fundamentally wrong, Aristotle's was the greatest genius that ever devoted itself to the pursuit of natural science.

It was long the fashion to look on him as the author of a system which, however advanced for the time before the birth of Christ or the middle ages, has now passed away as completely as the mythologies of Greece and Rome. The fashion is not yet over, though there are signs of its having begun to change. Its perseverance is due to the fact that its votaries are almost all as innocent of having ever read a page of Aristotle or of his disciples,—St. Thomas and the Peripatetic philosophers of the Christian schools,—as they are of having burned incense before the statue of Athene or of Jupiter. There is one great benefit we owe to the Materialists of this and the last century,—they have brought philosophy back to first principles ; and no one who gives himself

to the study of principles can long ignore the masters of the Peripatetic system. When men have begun to realize thoroughly that the Idealism of Descartes and the Nominalism of Locke, both necessarily result in Atheism,—then may we hope to see a more general return to the principles that have been so much neglected and despised by the teachers of Physics for the last three hundred years.

I do not mean to convey that in the choicest works of the ancients there is not much that we know to be false. The microscope, the telescope, the spectroscope, and the many other instruments of modern research, have not been so long employed in vain ; no one would confess this more readily than these very masters themselves, could they return once more. Ah, if Aristotle or St. Thomas had our instruments of knowledge ; or if God would now give another Angel to the schools of His Church !

There are many crude statements especially in the Physics of the ancients : but I am convinced that, if thoroughly tested, many of their theories would not be found to be so extravagant as they seem at first. Principal among these is the emission theory of qualities, with one of which we are now concerned,—“force ;” or, if you will, the quality in which force is sustained. I would ask you, therefore, to consider carefully what Aristotle has taught regarding the nature of this reality

II.

It is well known that among the writings of the Stagyrte there is a treatise on Physics,—a work which even modern scientists might consult with not a little advantage. One would think that if the Philosopher knew anything at all about his subject, he should have known

of "force;" and that, whatever else might be excluded from his treatise, this at least should find a place. Yet, unless it was understood by him to be precisely the same thing as motion, there is not a word about it in this most acute and elaborate treatise of his.

He discourses first of *being*, then of *essence*, next of *causes*; he passes on to treat of the final cause, the most important of all. Next, one would expect a dissertation on the efficient cause,—and he treats of motion. Not a word can I find on "force" as a reality distinct. I do not say that this is more than curious, in the sense of unexpected: like other curiosities it is not such except to the curious mind. But it does seem strange, when one reflects on it, that not only Aristotle himself, but so many of his disciples, should have written elaborate treatises on Physics and Metaphysics, and all things connected with them,—on essences and accidents; on substance, quantity, quality, relation, action, *passio*, time, place, situation, belongings,—all the categories of being; distinguishing the various species of each, till one's brain reels with the never-ending succession of subjects, illustrations, arguments, objections, solutions: it is strange that among all these elaborate dissertations one never comes across a treatise on "force."

The term is introduced, indeed, in connection with efficient causality, and often by the physicists; force is said to be emitted from substances, and to pass from one into another; but what it is which is thus emitted,—who ever saw a dissertation on that? I have not met with one except in the writings of a few who introduce the subject incidentally, and pass over it very lightly. If any one else, in reply to this Essay, can inform the world as to where the matter is discussed fully and satisfactorily, these pages shall not have been written in vain.

Strange that, though of the four realities,—motion, action, faculty, and “force,”—the most important by far is the last ; and though motion is said to be the *result* of action, which is *caused* by “force,” the *emanation* of faculty ;¹ yet we should have elaborate treatises on motion, action, and faculty ; but only just mention of “force,” the most important of all.

III.

Let us see, however. The ten categories mentioned in the preceding page, are the great classes into which Aristotle divided all the beings of which he had any knowledge. In the Catholic schools, at least, they serve the same purpose still ; every entity, possible or actual, that we know of, may be reduced to some one of these ten great classes.²

Now, there can be no doubt that the Philosopher was aware of the existence of force. It is altogether too obvious a reality to escape the attention of so acute an observer ; and as a matter of fact he often makes express mention of it in his writings,—particularly on *Physics*. To which category, then, did he ascribe it? I do not know, unless it be to *action*, under the name of *motion* ; which would fall in precisely with the kinetic theory.

Indeed, besides the category of action, it seems to me that there is but one other in which force could be located,—in *quality*, sure receptacle of everything that cannot be definitely classed. Go through the ten, yourself ; and even though you may have dynamistic notions, you will agree with me in this, at least. Force

¹ These are the relations usually ascribed to them.

² God cannot in any true sense be classified : yet we speak of Him as a *substance*, correcting our concept *via negationis*.

is manifestly not a substance ; nor is it quantity, nor a relation ; neither is it time, place, situation, *passio*, or *habitus*. There remain but quality and action ; either of which, accordingly, it must necessarily be.

As far as I can make out, Catholic Dynamists hold different views as to whether their “force” is to be regarded as a quality, or rather as an action ; all seem to be agreed that it is either one or the other. The Thomists are inclined to regard it as a quality, the Molinists as an action ;—though the latter are not always consistent, and often speak of it as not an action so much as something by which an action is produced.¹

I. Now, I want Dynamist readers each to make out for himself, as definitely as possible, what precisely it is he understands by “force.” What sort of a reality is it? To make this inquiry more easy, I will set down what my notion was while I was under the influence of the dynamic theory, and I will continue to illustrate what I mean by the example of the billiard-player :—

(a) It seemed to me that while the player holds the cue motionless in his hand, he has within him two great realities,—*substance* and *faculty* ; that is, there is *himself* and an *habitual power* of moving the cue ; this power, however, is not actually engaged in producing motion.

(b) Next, I was under the impression that when the cue is actually moved by the player, two other great realities are brought into being,—“*force*” and *motion*. “Force” is *exerted* by the faculty, and motion is *produced* by “force.”

(c) Further, I was persuaded that while the player, in actually moving the cue, has “force” as well as faculty,

¹ See chapter vi., sec. ii.

there is a peculiar *relation* between these two ; for I supposed the man's faculty to *exert* the "force," and the "force" to *proceed* or *emanate* from, or be *given out* by the faculty. Finally, between the "force" so exerted and the motion produced in the cue, I imagined there was *another* somewhat similar *relation* ; for the motion in the cue seemed to me to *result from*, or be *produced* or *caused* by, the "force" given out by the player.

(*d*) Accordingly, the whole process of the production of motion, as I used to understand it, comprises six different realities :—the player's substance, his faculty, the exertion of "force," the "force" exerted, the production of motion in the cue, and the motion produced. There is, in addition, of course, the substance of the cue, its capacity to receive motion, and the actual reception of the same ; but from these three we may abstract at present.

I never very distinctly asked myself, in the days when I believed in the foregoing six as really distinct entities, whether any of them is the same as *action*, and, if so, which it is. It may not be fair for me to answer the question now ; but if at present I believed in the dynamic theory, I should say that the *action* of a billiard-player consists neither in his substance, nor in his faculty, nor in his "force," nor in his motion ; but either in the *production* of motion or in the *exertion* of "force," or possibly in both ;—so that, in the last hypothesis, there would be two actions whenever there is one.

There can be no doubt that substance and faculty are not the same as action. It is the very essence of the dynamic theory, as opposed to the kinetic, that an agent's action is not the motion produced. Besides the two relations, therefore,—the exertion and the produc-

tion,—nothing remains but “force;” and it seems to me that ordinary Dynamists speak, write, and think of “force,” not as being in itself identified with action, so much as being the instrumental cause whereby an action is efficiently produced. They say, for instance, a man *performs* his actions *by means of* his “force.”

This is my notion of the dynamic theory in its most consistent form. The description may not satisfy all Dynamists; it is the best I can give; if it is deficient, its defects are due to a want of definiteness in the oral and written statements of the dynamic theory that I have come across.

2. I might here ask the reader whether he can really believe that whenever a man moves, he performs *two* actions,—the exertion of “force,” and the production of motion. And if each of these is not an action, why is it not?

Let us, however, go on at once to inquire whether the doctrine embodied in the foregoing statement is the teaching of Aristotle. Is it his opinion that action is not motion, but either the *exertion* of “force,” or the *introduction* of motion, or both? I answer: most certainly it is not.

According to the Philosopher, *action* is essentially a *motion* and *nothing but a motion*. The action of a billiard-player on a cue, is thus the local and other motions produced first in the player himself, and then in the cue. If this can be proved, it is the very opposite of all that is essential in the dynamic theory.

(a) In the opening chapter of his third Book on Physics, Aristotle sets about defining in the most formal manner what is meant by motion. He gives, in the first place, the following more or less general definition:

“Motion is the *act* (ἐντελέχεια) of *being in potentiality*, as such.”¹

After explaining this definition and defending it as true and legitimate, he goes on in the next chapter to inquire as to the subject in which motion is sustained, and concludes that “motion is the *act* (ἐντελέχεια) of a movable object, *in so far as this is movable*.”²

The question at once arises : Is the motion resident in the mover or in the thing moved? To which the Philosopher's reply is : it is in both. “Motion is in the movable object, for it is its act [ἐντελέχεια] ; and it proceeds from the moving agent ; but the act [ἐνέργεια] of the moving agent is not different. For, indeed, there must be an act [ἐντελέχεια] in both ; inasmuch as the mover also is in potentiality ; but moving, it [is in—comes into] act. Now it acts on the movable object. Wherefore, the act of both is one and the same.”³

He goes on to urge against this an objection which must have occurred at once to the reader : how can the *same* motion be in the agent moving and the object moved? In the agent it is an *action*, in the object a *passio*. If these two be one and the same, then it is the same thing to act and to suffer, to teach and be taught.

To the objection thus stated,—and the preceding paragraph is but a condensation and free translation

¹ τοῦ δυνάμει ὄντος ἐντελέχεια, ἥ τοιοῦτον, κίνησις ἐστίν. I quote throughout from Didot's text, so far as it is given in the Leonine edition of the works of St. Thomas. Whenever an extract is taken from any of the Philosopher's writings not published by the Leonine editors, it is quoted from the edition of Aristotle by Casaubon ; Lyons, 1590.

² Ἡ κίνησις ἐντελέχεια τοῦ κινητοῦ, ἥ κινητόν. *Ibid.*, cap. 2, Text 16.

³ Ἐστίν ἡ κίνησις ἐν τῷ κινητῷ· ἐντελέχεια γάρ ἐστι τούτου καὶ ὑπὸ τοῦ κινητικοῦ. Καὶ ἡ τοῦ κινητικοῦ δὲ ἐνέργεια οὐκ ἄλλη ἐστί. Δεῖ μὲν γὰρ εἶναι ἐντελέχειαν ἀμφοῖν· κινητικὸν μὲν γὰρ ἐστὶ τῷ δύνασθαι, κινεῖν δὲ τῷ ἐνεργεῖν. Ἀλλ' ἔστιν ἐνεργητικὸν τοῦ κινητοῦ, ὥστε ὁμοίως μία ἡ ἀμφοῖν ἐνέργεια. *Ibid.*, cap. 3, Text 18.

of Aristotle,—he replies to the effect that action and *passio*, though the very same motion, differ virtually. To borrow the Philosopher's own illustration, it is not necessary that he who teaches should learn, even though to do and to suffer be the same thing, provided they are not the same in the way in which a coat and a garment are the same,—*identitate rationis*,—but rather *identitate subjecti*, as the road from Thebes to Athens is the same as that from Athens to Thebes.

He concludes by applying to particular kinds of motion what he had said of motion in general,—that each is “the act (*ἐντελέχεια*) of a movable, in so far as it is movable;” that, as St. Thomas puts it in his *Commentary*, “motion is the act of the potentiality of the passive and of the active. And so one can even say in particular that building is the act of the builder and of what is capable of being built, in so far as it is capable; and the same is true of healing and of other motions.”¹ This doctrine is axiomatic in the Catholic schools, the formula being: *actio et passio sunt idem motus*.²

The foregoing is, I must admit, a rather lengthened statement; but it is of the greatest importance that it should be made clear from the beginning, that in the Aristotelic philosophy action is precisely the same reality as *passio*, both being the one motion.

Now, I ask any honest Dynamist whether he believes,

¹ “Ad tollendum omnem dubitationem aliquantulum notius dicamus quod motus est actus potentiae activi et passivi. Et sic etiam poterimus in particulari dicere quod aedificatio est actus aedificatoris et aedificabilis in quantum hujusmodi; et simile est de medicatione et aliis motibus.” St. Thomas in Arist. Phys. l. 3, c. 3, Lect. 5, n. 18.

² Cf. Goudin, *Philosophia*, Phys. Disp. 3, q. 1, a. 1: “Dico 2: Motus, actio, et passio, licet sint idem entitative, modaliter tamen videntur distinguui. Conclusio est communis, praecipue inter Thomistas. D. Thomas, saepe dicit quod actio et passio sunt unus numero motus.”

or can believe, in this axiom of the schoolmen. If action be either the *exertion* of a "force" or the *production* of a motion, as distinguished from the "force" and the motion themselves, and also from the faculty and its substance, how can it be a motion, not to say the *same* motion as *passio*? And if these two cannot be motion, and the same motion, how is not the dynamic theory of activity fundamentally opposed to the doctrine of Aristotle? For be it always remembered that this dissertation on motion is the basis of the whole Aristotelic system of Physics. And lest it should be thought that possibly he means by motion something different from local displacement, he gives examples of the motion to which his initial definition applies, and which he has before his mind throughout. It is "alteration of the alterable, in so far as it is alterable; of what is capable of augmentation or the opposite . . . it is increase and decrease; of what is capable of generation and corruption, it is generation and corruption; and of *what may be changed in place*, it is *local displacement*."¹ There cannot be the least doubt that whatever Aristotle says of motion applies to change of place, which, as he often insists, is the basis of all motion whatever.

IV.

All through the passages referred to in the last section, and indeed all through his writings, the Philosopher makes constant use of the words *δύναμις* and *ἐνέργεια*. I beg to call attention to these terms as

¹ Οἷον τοῦ μὲν ἀλλοιωτοῦ, ἢ ἀλλοιωτόν, ἀλλοίωσις· τοῦ δὲ αὐξήτου καὶ τοῦ ἀντικειμένου φθιτοῦ . . . αὔξησις καὶ φθίσις· τοῦ δὲ γενητοῦ καὶ φθαρτοῦ, γένεσις καὶ φθορά, τοῦ δὲ φορητοῦ φορά. Phys. Lib. 3. Cap. i. The reader will call to mind the three kinds of motion mentioned at p. 1; in the philosophy of Aristotle each of the three is really identical with action and *passio*. See *antea*, p. 25, note; *infra*, chap. xiv.

throwing light on his views regarding the nature of activity.

Δυναμις he almost invariably uses to designate *potentiality*, whether passive or active,—that is, what we usually call a *faculty*: the term is rarely, if ever, used by him in the sense of force. *Ἐνέργεια* is the *act* of *δύναμις*; hence it is a *form* or *faculty*, as completing a *passive potentiality*; it is also the *action* whereby the *faculty* already brought into existence is further completed within its own self.

I have been to some pains to make sure that this is the correct use of these terms in the works of the Stagyrte. In proof of my contention I will refer first to some of the lexicographers, and afterwards to some texts from the Philosopher's own writings.

1. In the *Thesaurus* of R. Stephanus, under the word *δύναμις*, I find the following :—"The Greeks say that a thing is in potentiality (*δυνάμει*), which is not indeed in act, but can be; as a seed is a small thing, indeed, but potentially (*δυνάμει*) a large tree."¹

As the second meaning of *δύναμις*, Liddell and Scott give the following :—"II. *Any natural faculty that may be improved, and may be used for good or ill.* Arist. *Top.* 4. 5, 9; *Magn. Moral.*, i. 2, 2; 7, 2." And their fourth head of signification is: "*capability of existing*; hence *virtual existence*, as opposed to actual existence, *ἐνέργεια*, *ἐντελέχεια*: Arist. *Metaphys.*, 8. 6; 8. 9:—hence *δυνάμει* as Adv. *virtually*, Lat. *potentia*, opposed to *ἐνεργεία*, Lat. *actu*. Idem, *Analyt. Poster.*, i. 24, *fin.*"

I should remark, that though Liddell and Scott give other meanings for *δύναμις*, amongst them that of force,

¹ "Δυνάμει esse dicunt Graeci quod actu quidem non est sed esse potest, ut semen est quidem exiguum, sed δυνάμει magna arbor."

Aristotle is not referred to as using the term in that sense ; whereas he and he only is quoted all through as using the word to designate potentiality and faculty.

Dunbar, in his Greek-English Lexicon, says : “ *Δύναμις* is used by Aristotle to denote a capacity, or inherent power, or faculty, which is prior both to the exertion of force and the production of effects ;—also capacity, whether of acting or suffering ; the principle of change.”

Let us turn now to *ἐνέργεια*. Stephanus says : “ *ἐνέργεια* is action, act ; Arist. : *εὐδαιμονία ἐνέργειά τις ἐστίν* [happiness is a certain *ἐνέργεια*]. And in the same author's works some virtues are *καθ' ἑξίν* [habits] others *κατ' ἐνέργειαν*. It is also the efficacy, efficacious force, which acts in some thing.”¹ And again : “ Budaeus, following the opinion of some interpreters, translates *ἐνεργῆν* in Aristotle as *actu esse* [to be actual] ; as *πάν γὰρ οὕτω δυνατόν, οὐκ ἀεὶ ἐνεργῇ* [for everything is thus in potentiality, but is not always in act]. However, in the same Aristotle *ἐνεργούμενα* is found in the ordinary signification.”²

Similarly, Liddell and Scott : “ *ἐνέργεια*, an action, operation, energy ; opposed to *ἕξις*, a habit ; Arist. Eth. N., i. 1, 2, &c. ; *ἐνέργεια*, actually, opposed to *δυνάμει*.” Again : “ *ἐνεργέω*, to effect, execute ; . . . to work, to be active, especially of mental activity : Aristotle.”

These are samples of what I have found in other Greek lexicons.

2. Anyone who has even a slight acquaintance with

¹ “ *Ενέργεια*, actio, actus ; Arist. : *εὐδαιμονία κ.τ.λ.* Et apud eundem, e virtutibus aliae *καθ' ἑξίν*, aliae *κατ' ἐνέργειαν*. Item efficacia, vis efficax quae in aliquo agit.” In verb. *ἐνέργεια*.

² “ Apud Aristot. *ἐνεργῆν* Bud. e quorundam sententia vertit *ctu esse* : ut *πάν γὰρ κ.τ.λ.* Ex eodem tamen Aristot. affertur *ἐνεργούμενα* de Mundo in vulg. signif.” In verb. *ἐνεργέω*.

the writings of the Stagyrice, will not need the testimony of lexicographers to convince him that these terms, and especially *ἐνέργεια*, are to be understood in the sense that is here ascribed to them. They are to be found almost on every page of the writings of the Philosopher, especially in his works on Physics and Metaphysics; so that one who would make a selection of passages to illustrate Aristotle's use of the terms, is embarrassed only by the abundance of the materials from which he has to draw. It seems to me, moreover, that in some passages the Philosopher makes his own meaning so clear, as to satisfy one immediately regarding the sense in which he understood these words.

(a) In the sixth chapter of the eighth Book on Metaphysics, we read :—

“ *Act* (*ἐνέργεια*) is the *existence* of a thing ; [its] not [being], as we say, in *potentiality* (*δυνάμει*). Now we say [a thing is in] potentiality, as, for instance, a Mercury in wood, and a half in the whole, inasmuch as it can be taken away ; and we designate as intelligent one who *does not* think, provided he *is able* to think. All things, however, are not said to be in act in the same way, but proportionally ; as this *in* this or *to* this ; that *in* that or *to* that. For some things are as motion to a faculty (*δύναμιν*) ; others as substance to some matter.”¹

I have thought it better to give an almost literal translation of the passage, lest anyone who may differ from me on the main question, should doubt whether I may not have put a gloss of my own on the words.

¹ Ἔστι ἡ ἐνέργεια τὸ ὑπάρχειν τὸ πρᾶγμα, μὴ οὕτως ὥσπερ λέγομεν, δυνάμει. Λέγομεν δὲ δυνάμει, διὸν ἐν τῷ ξύλῳ Ἑρμῆν, καὶ ἐν τῇ ὅλῃ τῇν ἡμίσειαν, ὅτε ἀφαιρηθεὶς ἂν καὶ ἐπιστήμονα καὶ τὸν μὴ θεωροῦντα, εἰὰ δυνατὸς ἢ θεωρῆσαι . . . Λέγεται δὲ ἐνεργεία οὐ πάντα ὁμοίως, ἀλλ' ἢ τὸ ἀνάλογον, ὡς τοῦτο ἐν τούτῳ, ἢ πρὸς τοῦτο· τὸ δ' ἐν τῷδε ἢ πρὸς τόδε. Τὰ μὲν γὰρ ὡς κινήσεις πρὸς δύναμιν, τὰ δ' ὡς οὐσία πρὸς τινα ὅλην.

of the Philosopher. The meaning of the passage is plainly this :—

Act is the actuality of a potentiality. Now, a thing is said to be in potentiality when it has a *capacity* for *being* or *doing*, but is not actually in existence or in operation. In this sense a block of unhewn wood is potentially a statue of Mercury ; a half, as such, is in the whole before this is divided ; and a being may be said to be a thinking being, even when it is not actually thinking, provided it is capable of thought. Act is the completion of that potentiality.

There are thus different kinds of acts, principally two. For a potentiality may become complete *without motion* or *by means of it*. Substantial *forms*, such as the souls of men, are the acts of *matter*, which in itself is merely in potentiality ; whilst *motion* is the act of the *faculty* of moving oneself or another.

Accordingly, ἐνέργεια conveyed to the mind of Aristotle the idea either of a form or faculty, or of a motion. In the first of these significations the term came to be translated “act” by the Philosopher’s Christian disciples, who used the word *action* to express the second idea. This distinction, however, is not always observed ; the operations of bodies, but much more those of spirits, intelligence and will, being not unfrequently called acts. The word, act, is thus capable of one or other of two significations, just as ἐνέργεια is in the writings of Aristotle.

(b) In the third book of the *Physics*, Chapter I., there is a passage to the same effect, but bearing even more closely on the main question, as to the nature of activity. This second passage runs as follows :—

“The [act] of a being in potentiality, when the being actually energizes (ἐνεργῇ), whether [on] itself or [on] another, in so far as it is movable, is motion. I say ‘in so

far as it is so.' For bronze is potentially a statue ; however [it is] not the act (*ἐτελέχεια*) of the bronze, in so much as it is bronze, [which] is motion ; for it is not the same [thing] in bronze to *be* and to *be in potentiality* to some movable [reality]. For, if it were the same [thing] simply and in [the same] respect (*λόγον, rationem*), motion would be the *ἐτελέχεια* of bronze, as bronze. But it is not the same, as has been said. That, therefore, this is [so], and that it happens that [a thing] is moved, when this [its] act exists, and neither before nor after, is manifest. For it happens that everything energizes sometimes, but sometimes does not, as [for instance] the *buildable*. And the act (*ἐνέργεια*) of the *buildable*, in so far as it is *buildable*, is *building*. For, either building or the house [built] is the act (*ἐνέργεια*) of the *buildable*. But when the house *is*, it is no longer *buildable* ; yet it is the *buildable* which is built. It must be, therefore, that building is the act (*ἐνέργεια*). Now, *building* is a *kind of motion*."¹

The same distinction between potentiality and act will be observed running all through this passage. There is first a being in potentiality (*δυνάμει ὄν*). This potentiality is of many kinds : thus, first matter is in potentiality to become bronze ; and its *ἐνέργεια*, as such, is the bronze form. A mass of bronze or of wood is in potentiality to become a statue or a column ; when the *ἐνέργεια* is the figure which is given to the material. The statue or column may become a portion of a

¹ Ἡ δὲ τοῦ δυνάμει ὄντος, ὅταν ἐτελέχεια ᾖ ἐνεργῇ ἢ αὐτὸ ἢ ἄλλο, ἢ κινήτῳ, κίνησις ἐστὶν. Λέγου δὲ τὸ ἢ ὡδί· ἐστὶ γὰρ ὁ χαλκὸς δυνάμει ἀνδρίας, ἀλλ' ὅμως οὐχ ἢ τοῦ χαλκοῦ ἐτελέχεια, ἢ χαλκός, κίνησις ἐστὶν· οὐ γὰρ τὸ αὐτὸ τὸ χαλκῷ εἶναι καὶ δυνάμει τινὶ κινήτῳ. Ἐπεὶ εἰ ταῦτόν ἦν ἀπλῶς καὶ κατὰ τὸν λόγον, ἦν ἂν ἢ τοῦ χαλκοῦ, ἢ χαλκός, ἐτελέχεια κίνησις. Οὐκ ἔστι δὲ ταῦτόν, ὡς εἴρηται. . . Ὅτι μὲν οὖν ἐστὶν αὕτη, καὶ ὅτι συμβαίνει τότε κινεῖσθαι, ὅταν ἢ ἐτελέχεια ἢ αὕτη, καὶ οὔτε πρότερον οὔτε ὕστερον, δῆλον. Ἐνδέχεται γὰρ ἕκαστον ὅτε μὲν ἐνεργεῖν, ὅτε δὲ μή, οἷον τὸ οἰκοδομητόν. Καὶ ἢ τοῦ οἰκοδομητοῦ ἐνέργεια, ἢ οἰκοδομητόν, οἰκοδόμησις ἐστὶν. Ἡ γὰρ ἢ οἰκοδόμησις ἢ ἐνέργεια τοῦ οἰκοδομητοῦ ἢ ἡ οἰκία. Ἀλλ' ὅταν οἰκία ᾖ, οὐκέτι οἰκοδομητόν ἐστιν· οἰκοδομεῖται δὲ τὸ οἰκοδομητόν. Ἀνάγκη ἄρα τὴν οἰκοδόμησιν τὴν ἐνέργειαν εἶναι. Ἡ δὲ οἰκοδόμησις κίνησις τις ἐστὶν.

building ; but in order to this it has in the first place to be moved : hence the ἐνέργεια of this particular δύναμις is motion. And so on.

I will not inflict on the reader any more passages to prove this point ; but will take it that the meaning which Aristotle attached to δύναμις and ἐνέργεια, is what has been here represented ;—what the Schoolmen called *potentia* and *actus*. Let it be observed, however, and carefully remembered, that each of these,—potentiality and act,—is of two kinds, known in the Catholic schools as *first* and *second*. *First potentiality* is a capacity of acquiring an inoperative *form* or *quality* ; which, when acquired, is the *first act*. Thus, first matter is in first potentiality to all possible material forms ; it is only when it gets any one of them, that it becomes *actual*,—it has its first act. The *second potentiality* is a capacity for *acting, doing, or suffering* ; and the action or *passio* thus produced or acquired, is known as the second act. The Schoolmen said of a thing, that it is *in actu primo* when it *exists*, and *in actu secundo* when it *operates* : this distinction also is fundamental in Catholic philosophy.

The acute reader will have observed, moreover, that the first potentiality and first act may be more or less complete,—that there are stages, as it were, on the road to its perfection. The *possible* essence first gets *existence* as its act. A piece of bronze, being in existence, gets certain qualities,—shape, colour, heat, &c. : these, being qualities and not actions, belong still to the first act, not the second. The first is technically said to become, by each accession, *more proximate*,—to its final completion, of course. When it is fully completed,—when it has got the last touch of quality,—it is said to be *in actu primo proximo*,—in that stage of the *first act* which is of all others nearest to the *second*. This *actus primus proximus* is the *second potentiality* ; the next step in the

way of perfection being the *operation, second act, or action*. This is all well known to those who have become acquainted with the Catholic system of philosophy ; it is necessary to explain it for the sake of others who may read this Essay.

(c) Now, the question you have to ask yourself is this : bearing in mind what you know of the meaning attached by Aristotle to *ἐνέργεια* of the *second* kind,—the *second act*,—and also what you know of the dynamic theory of activity, do you think Aristotle believed in what the Dynamists called “force”?

As I understand their theory, “force” is something midway between the faculty and its qualities on the one hand, and action on the other. Conceive an agent—a billiard-player—with all his faculties and qualities, as being in a state of absolute repose, just ready for immediate action, before he has exerted the least “force” ; and you conceive him as being *in actu primo proximo*,—in the very last stage of the first act. Accordingly, the least additional act he can get, must belong to the second act. What, then, is the next act he gets? Is it action? No, say the Dynamists, it is “force” ; for “force” is conceived by them as a reality midway between and really distinct from the faculty and its action. The faculty operates by first giving out a “force.” That is, as I understand it, the very essence of the dynamic theory.

How far is it in conformity with the teaching of Aristotle? I assert, that to the mind of the Philosopher the second act is action and nothing prior ; that it is also *passio*—for this is the same reality as action ; and that it is also motion—motion of all kinds, local movement among the rest, and first in order of all ; for motion, action, and *passio*, are but virtually and not really distinct. If this be true, then it will follow that to

D

the mind of Aristotle, when a billiard-player is conceived as getting the least addition to his first completed act—the *actus primus proximus*,—the act or ἐνέργεια which he gets is motion or action ; and that whatever force he has in addition to his completed qualities, is not really distinct from and prior to this first motion.

For proof of this assertion I refer you again to the texts already quoted. Is the second act or ἐνέργεια a *quality, capable of* immediate motion, or is it motion itself? “All things are not said to be in act in the same way, but proportionally ; as, this *in* or *to* this, that *in* or *to* that. For some things are as *motion* to a *faculty*, others as *substance* to some *matter*.”¹ “The act of a being in potentiality, *when the being actually energizes*, whether on itself or another, in so far as it is movable, *is motion*.”² “That a thing *is moved* when *its act exists*, and *neither before nor after*, is manifest. For it happens that everything energizes sometimes and sometimes does not—as, for instance, the *buildable*. And the ἐνέργεια of the *buildable*, in so far as it is *buildable*, is *building*. . . . Now, *building* is a *kind of motion*.”³

All through the works of the Stagyrite this doctrine runs as an axiom : ἐνέργεια (meaning thereby the second act), is *motion*. You have an illustration in the first sentence of the last quotation : “*the act of a being in potentiality, when the being actually energizes*, whether on itself or on another, in so far as it is movable, *is motion*.” Extracts of the same kind might be multiplied indefinitely. “Motion seems to be a certain ἐνέργεια though imperfect.”⁴ It is imperfect, until it reaches and produces its *term*, by which it is completed. Of the senses of the body, he says : “their action (ἐνέργεια) *is motion* through the body.”⁵ And, in general, he

¹ Metaph., Book 8, ch. 6.

² Phys., Book 3, ch. 1.

³ Ibid.

⁴ Phys., B. 3, ch. 2.

⁵ Ibid., B. 7, ch. 2.

lays it down, "that motion is *in* the movable, for it is its *ἐντελέχεια*, and *from* the mover; and the *ἐνέργεια* of the mover (τοῦ κινητικοῦ) is not different."¹ This is, so far as I am aware, the first mention of *kinetic energy* (ἐνέργεια τοῦ κινητικοῦ) in any scientific treatise. I have placed the text on the back of the title-page of this Essay, as containing within itself the germ of the whole kinetic theory,—the doctrine that identifies all forms of energy with motion.

v.

There is one point with regard to which Aristotle seems to differ from the kinetic theory, as it has been propounded recently;—I refer to the identity and continuity of movement. According to the moderns, motion,—such, at least, as is not vital,—like matter, passes through many forms, but neither begins nor ever ceases to be. The rush of the train is not merely *due* to the impulse of the steam in the boiler of the locomotive, it is the very same movement, which has left the water to pass into the wheels. Similarly, the heat-motion *came into* the steam from the coals, and into them from the sun, many ages ago, when the plants were grown from which the coal-beds were formed. The sun itself got its motion, is still getting it, from who knows what other source of energy? Through all these changes and revolutions the substance of the movement remains the same, though the forms through which it passes are constantly changing.

Now, Aristotle seems to teach in more than one place, that motion is not continuous unless the subject in which it is sustained be truly one.² If this be so, it would go to prove that the Philosopher was opposed to the kinetic

¹ *Ibid.*, B. 3, ch. 3.; see Greek text at p. 24

² See e.g. Phys., B. 5, ch. 4.

theory, as explained in the opening chapter of this Essay.

The argument thus stated brings up the whole question of the conditions of individuality,—one of the most intricate and subtle that can occupy the mind of man. I do not intend to obscure the issues further, by a metaphysical discussion not really necessary for my purpose. I will content myself with three remarks in reply:—

(1) In the first place it is not an absolutely essential portion of the kinetic theory, that motion, in passing from one agent to another, should retain its individuality. What is essential is, that *nothing but motion* should be transmitted,—no distinct reality, such as Dynamists understand by “force.” What if, after all, the motion, having passed from its previous subject, should not remain individually the same?

(2) Let us suppose, with the Dynamists, that, in addition to motion, “force” passes: the question arises, whether it, at least, continues the same after the passage as it was before? Is it really the self-same “force” that long ago existed in the sun, that now lies stored up in the coal-beds, and is communicated to steam-engines to whirl us over land and sea? I have a notion that the arguments of the Philosopher would prove as effectual against the continuity of “force,” as against the continuity of motion; and whatever view is advocated by Dynamists regarding the continuance of the same individual “forces,” can be applied with very slight modification to the perseverance of motion in the kinetic theory.

(3) But, really, is there not a sense in which a thing may lose some of its unity,—even of its individuality,—while retaining another portion of the same,—a portion of a more or less generic kind? The terms may seem to

be meaningless. I will explain by an example what I would convey :—

When a man dies, his body loses its *specific unity* ; it is another kind of thing now,—not a man, but so much flesh and bone. One might think that with the specific the *individual unity* should vanish ;—that the corpse would no longer be the self-same individual that existed as a man. Nor is it, in a certain sense.

But is it not the same individual body in *some* sense ? Is that not the body of your father or mother,—the same cheeks you kissed in childhood ; the same hands that did you so much kindness ? For Catholics this is a most serious consideration ; inasmuch as we believe that it is that body and no other,—that rib or skull or other member, dug up but now from where it lay rotting in the grave,—that it is the same individual piece of matter, which will be raised up on the last day.

The same individual, yet not the same. The body to which it belonged has not yet *altogether* passed away. It has gone through many forms ; corrupting and again corrupting ; sinking ever lower in the scale of being, till it has almost reached the lowest form of all. It has almost become a kind of first or generic matter, that might be fitted up to become anything. Yet *it*, and not any lower form, will be taken up at the resurrection, out of reverence for that portion of its original construction which even still it retains.

This is how I understand the resurrection of the individual ;—not merely, be it understood, of the individual that *was* once living, but of the individual body or matter that *is* now in the grave. And if it is possible, as it must be, to reconcile with the Peripatetic philosophy this change and yet survival of individuality in *substances*, I do not find it difficult to believe that Aristotle may have meant to convey, in the passages

referred to, that *some* of the individuality of a *motion* must be lost when the motion passes from one kind of substance into another, thereby changing its species ; whereas he might be prepared to admit that the individuality in its *entirety* does not thereby cease to be. At any rate, that is how I understand the conservation of energy or motion in the kinetic theory,—the individual reality is preserved, but not quite the same.

NOTE TO CHAPTER II.

To avoid the necessity of returning to this point, when discussing the teaching of St. Thomas, I may be permitted to anticipate a little, and to inquire here, what was the mind of the holy Doctor with regard to this question of the perseverance of individual motions? Nor will this inquiry be without its bearing on the subject of the present chapter,—the teaching of Aristotle ; for, on questions of Physics, St. Thomas studied the Philosopher so carefully, and followed his teaching so closely, as to make it very probable that what the disciple held, is either borrowed from or at least quite reconcilable with the teaching of the master.

In his treatise *De Potentia*, the Angelic Doctor writes :—

“ When it is said than an accident does not pass from one subject to another, this is understood of an accident which remains numerically the same ; not that an accident similar in kind may not be produced in another subject, by virtue of one that is resident in some natural thing.” “ Cum dicitur accidens de subjecto in subjectum aliud non transire, intelligitur de accidente eodem secundum numerum ; non quin simile accidens secundum speciem possit induci in aliud subjectum, virtute accidentis quod alicui subjecto naturali inest.” (*De Pot.*, q. 3, art. 7, in c.)

This might seem to be quite decisive against my view. Turn, however, to the *Summa Theologica*, where the holy Doctor treats of the death of Christ ; and you will find this.

question :—"Was the body of Christ the same in number during life and after death?" Against the numerical identity he proposes the following difficulty :—"Christ truly died like other men. Now, the body of any other man is not simply the same after death, as it was during life ; for the two differ essentially. Therefore, neither is the body of Christ the same individual when dead as during life." "Christus enim vere mortuus fuit sicut alii homines moriuntur. Sed corpus cujuscunque alterius hominis non est simpliciter idem numero mortuum et vivum ; quia differunt essentiali differentia. Ergo neque corpus Christi est simpliciter idem numero mortuum et vivum." (3, q. 50, a. 5.)

Notwithstanding this argument, the reply to the question is, that in a certain sense Christ's body remained simply the same in number, though in another sense it did not. It remained the same individual *in supposit* (i. e., it was united to and sustained by the same Person) ; but it did not remain *altogether* individually the same. It is not, however, to this distinction that I would call attention, so much as to what the holy Doctor says in reply to the objection he had put to himself :—

"The body of any other man does not remain united to any permanent *hypostasis* (personality), as did the dead body of Christ. Hence the dead body of any other man is not the same simply, but only in part (*secundum quid*) ; for it is the same in its matter, but not in its form." "Corpus mortuum cujuscunque alterius hominis non remanet unitum alicui hypostasi permanenti, sicut corpus Christi mortuum. Et ideo corpus mortuum cujuscunque alterius hominis non est idem simpliciter, sed secundum quid ; quia est idem secundum materiam, non autem secundum formam." (*Ibid.*)

Here we have an acknowledgment that a thing may remain the same individual in part, though not altogether. Now, what is this identity in matter? No one knew better than St. Thomas, that the individuality of the matter of any body depends on its *extension* : as long as the extension remains the same, the individual matter remains. This is

exemplified at death ; when the extension of the living body is changed essentially, life becomes extinct,—the individual is no longer the same.

Hence, at the point of death even a man's matter loses its identity,—loses it in part, but not altogether. Something of him remains ; what it is I have endeavoured to explain. In this respect accidents follow the rule of substances, except that the former depend for their individual identity on continuity in time as well as in space. If, therefore, a body may remain partly the same individual, though it has lost its specific identity, it is most natural that *motions* should continue individually the same in part, though their specific character may have changed.

It is very necessary in Catholic theology to remember that it is not merely the same individual body that *was once living* that will be raised from the dead,—raised such as it was at every moment of its life ; but that the same is true of the individual body in the grave. Hear St. Thomas :—"It belongs to the same to rise and to fall. Hence the resurrection regards rather the body that falls after death than the soul which after death is still living." "*Ejusdem est surgere et cadere. Unde resurrectio magis respicit corpus quod post mortem cadit, quam animam quae post mortem vivit.*"—(q. 82, a. 1.)

He continues in answer to an objection :—"That which must exist in the matter before it can get its form, remains in the matter after the form has departed ; for what came first may remain after what came later has gone away. However, in this matter of generation and corruption of forms, before a substantial form can be given, it is necessary that there should be in the matter *dimensions non-terminated* (*dimensiones non-terminatas*), according to which the division of the matter itself may result, so as to render it fit to receive different forms in different parts. Hence, also, after the separation of the substantial form from matter, these dimensions still remain the same. And thus the matter existing under these dimensions, whatever form it receives, has a

greater identity with that which had been generated from it, than any other portion of matter that may exist under any other form. And thus, to build up the human body the same matter will be used again that had been its matter in the original state." I have translated the passage freely, to the best of my ability:—"Illud quod intelligitur in materia ante formam, remanet in materia post corruptionem; quia remoto posteriori adhuc potest remanere prius. Oportet, autem, in materia generabilium et corruptibilium, ante formam substantialem intelligere dimensiones non terminatas, secundum quas attendatur divisio materiae, ut diversas formas in diversis partibus recipere possit. Unde et post separationem substantialis formae a materia, adhuc dimensiones illae manent eadem. Et sic materia sub illis dimensionibus existens, quamcunque formam accipiat, habet maiorem identitatem ad illud quod ex ea generatum fuerat, quam aliqua pars alia materiae sub quacunque forma existens. Et sic eadem materia ad corpus humanum reparandum reducetur, quod prius materia ejus fuit." (*Ibid.*)

The most remarkable portion of the passage is the clause in which the holy Doctor refers to the perseverance in some measure of the "*dimensiones non terminatae*." He teaches, if I mistake not, that a man's individual extension does not altogether cease at death. Hence, the corpse is partly the same reality as the living body had been; and, accordingly, the corpse, and it only, will be "repaired" at the resurrection. If, therefore, a *body* may remain in this sense the same individual under another species; and if this is due to a continuance of accidents, such as dimensions; it is only natural that the same should be true of motion; which thus would not lose its identity altogether when passing from subject to subject.

CHAPTER III.

ST. THOMAS.

I.

IF the question at issue were whether there is in the world around us such a thing as force, there could be no doubt as to the answer we should get from St. Thomas and his disciples. All through the works of the Angelic Doctor, as indeed all through theology and philosophy, we meet with the idea of force, expressed in many forms.

Most commonly with St. Thomas the notion is conveyed by the term *virtue*. This word has two meanings in the writings of the Saint, as, indeed, of all theologians. In its first signification it designates a mere *quality*, which may lie quite inoperative for a lengthened period,—may even never be called on to act. Thus, it is the common teaching of the Catholic schools, that supernatural virtues of all kinds, moral as well as theological, are infused into the souls of infants on the occasion of their baptism. It is quite plain that these virtues do not operate till long afterwards, and it is not probable that each of the moral virtues will in all cases ever be called on to act,—at least in this life, even though it should be of long duration.

The word, virtue, has a second meaning, as when we say that a certain effect is produced *by virtue of* some agent. The reality corresponding to this idea is never quiescent; it ceases to be, the moment it ceases to act. This may seem opposed to such commonly received notions as “latent heat” and “energy of position;” but I think it will be found that there is no actually active virtue in anything that is quite quiescent. Such, at

least, is the received teaching in the Peripatetic schools ; and it may be easily reconciled with modern notions, as I shall show later on. In this second signification the word *virtue* is but another name for force.

That these two are the only forms of virtue recognised by St. Thomas, at least in the case of natural operations, will not be disputed, I think, by any close student of the writings of the Saint. Should the reader seek for proof, he will find sufficient of it in the extracts I am about to submit in this and the following chapters. A passage from Ferrariensis is too much to the purpose to be omitted here :—

“It is to be remembered that, according to St. Thomas, there are *two powers (duplex vis)* present in created things while they are acting. One is the *form*, which is something fixed and permanent in the nature ; created agents act by means of this as by their own natural power. The other is a *force (vis)*, which is a *mere intention* of the divine power,—a *thing incomplete*, as *colours are in the air*, and the power of art in an instrument. This second force *is not found in agents unless when they are actually in operation*, and act as the instruments of the divine power ; as the force (*virtus*) of art does not remain in an instrument, unless while it is making use of the instrument for the artistic operation. God, accordingly, *gives* natural things *both these powers* ; but the second He communicates to them only while He applies them to operation.”¹

Here we have, from one of the Saint's most celebrated

¹ “Advertendum ex doctrina S. Thomae (de Pot. q. 3, a. 7, ad 7), quod duplex vis ad agendum rebus creatis inest dum agunt ; una est forma habens esse firmum et ratum in natura, per quam agunt tanquam propria et naturali virtute ; alia est *vis* quae est *intentio sola* virtutis divinae, habens esse incompletum per modum quo *colores sunt in aere*, et virtus artis in instrumento ; et ista vis non convenit rebus nisi quando actualiter operantur et agunt tanquam divinae virtutis instrumenta ; sicut et virtus artis non remanet in instrumento nisi quando ipso utitur ad operationem artis. Deus ergo dat rebus naturalibus utramque virtutem ; sed secundum tantum illis communicat dum eas ad operationem applicat.” Lib. 3, Contra Gent, c. 70.

interpreters,¹ a brief, but definite statement of the Angelic Doctor's teaching. There are in every created agent two powers (*duplex vis*); one permanent, by way of form or faculty; the other transient, lasting only while the action lasts, *intentional*. We shall see afterwards what this last epithet may signify.

II.

Seeing, then, that St. Thomas recognises but two species of virtue or power, "*duplex vis*," and that one of these is a form, or faculty, or quality,—"*something fixed and permanent in the nature*,"—and therefore altogether different from what "*force*" is represented as being; if this "*force*" enters into the philosophic system of the Saint, it must be identical with the second species of virtue or power. Accordingly, if we can discover what St. Thomas understands by *virtue*, in this second acceptance of the word; what is its origin, and what its mode of conservation; we shall have the opinion of the Angelic Doctor on the subject of this Essay.

The remark with which I began my observations on the teaching of Aristotle, applies here with equal, if not greater, point;—that it is passing strange, seeing that "*force*" is such a remarkable entity, according to the

¹ The works of Ferrariensis and of Cajetan have been described by the present Pope as "*copious streams, through which the doctrine of St. Thomas has come down to us*." "*Edendas curabimus clarissimorum ejus [S. Thomae] interpretum, ut Thomae de Vio, Cardinalis Cajetan, et Ferrariensis, lucubrationes, per quas tanquam per uberes rivulos, tanti viri doctrina decurrit*." (Letter of Leo XIII to Card de Luca, with regard to the new edition of the works of St. Thomas.) Francis de Sylvestris, known as Ferrariensis, was the fortieth general of the Dominican Order. In the passage quoted he has before his mind merely natural actions; for, as we shall see presently (p. 54, note 1), in case of supernatural or of preternatural motions, when there is no permanent form infused, the agent must get at least a transient quality.

dynamic theory, that St. Thomas should not have given us a formal treatise, or at least a dissertation, on the matter. Every theologian knows how the holy Doctor spent himself in the *Summa*, in elaborating what is perhaps his most finished production,—the exposition of virtues of the habitual kind. Incidentally, of course, he often mentions virtue in its second signification ;—I hope even to show that he leaves no doubt as to what he means by the word in this sense. But these references are only incidental. Like his master, Aristotle, he never undertakes to treat formally of the nature of force ; unless it be in the Commentary which he has left us on those Chapters of Aristotle's *Physics* in which the Philosopher treats of Motion. If force were, to the mind of the Angelic Doctor, different from motion, this would be very strange indeed.

III.

I think it will be admitted that, apart from the Commentary just referred to, St. Thomas's most distinct references to the nature of force will be found in those passages wherein he discusses the nature of *instrumental causality*. For example, in explanation of his doctrine that the Sacraments are instruments in the hands of God for the physical infusion of grace into the soul, he writes as follows :—"The Sacraments do not produce grace by virtue of their own forms ; for, if so, they would operate of themselves. But they act by the virtue of a principal agent,—*i.e.*, of God,—existing within them. This virtue, indeed, is not a being complete in its nature, but a thing incomplete in the scale of being ; as *is manifest* from *this*, that *an instrument moves* according as *it is moved*."¹

¹ Sacramenta non operantur ad gratiam per virtutem propriæ formæ ; sic enim operarentur ut per se agentia. Sed operantur per virtutem principalis agentis, scil. Dei, in eis existentem. Quæ quidem virtus non

St. Thomas's theory of instrumental causality is :— Something goes out from the principal agent, and is received into the instrument ; and it is precisely by this transient something that the instrument is able to act. A man takes a saw and cuts a piece of wood ; in order to do so, he must communicate something to the saw. There is no one who will not agree so far with the holy Doctor ; and I suppose most people are accustomed to call what is communicated by the name of force.¹

Now, what is this force in itself? This is the original question. What if St. Thomas were to call it *motion*? If he were even to prove that it is what it is,—incomplete,—because it is motion and nothing else? That would be precisely what I am contending for.

Let us see, then. In the passage just quoted the Angelic Doctor states that the *virtue* (force) of the principal agent, existing in the instrument, is incomplete in the scale of being. Be careful to remark the proof:—"as is *manifest* from *this*, that an instrument *moves according as it is moved*." It moves only as it is moved : but how does that prove the incompleteness of force? Not, surely, unless force be motion, and motion be itself incomplete. Hence the holy Doctor proceeds :—

"[Force, *Virtus*] is something incomplete in the scale of being, as is manifest from this, that an instrument moves according as it is moved. But *motion is an imperfect act* [ἐνέργεια], according to the Philosopher (*Phys.*, lib. iii.,

habet esse completum in natura, sed est quid incompletum in genere entis ; quod patet ex hoc, quod instrumentum movet in quantum moveretur." De Verit. Q. 27, art. 4, ad 4. The italics, of course, are always mine, whenever they occur in a quotation from one of the ancient writers.

¹ It is well known that modern physicists have an objection to the use of this term : they prefer the word, *energy*. It does not make much matter which word is used ; but even those who are most opposed to the idea of force, are themselves unable to write on Physics without often lapsing into the use of the term.

text. 15). Hence, as these things which move precisely as, being as it were at the term of their motion, they are made like to the agent, move by a perfect form; so those that move *precisely as they* are in motion itself [instruments], move by a force (*virtus*) that is incomplete."¹

In the body of the same article the Saint had written:—"This is the very essence of an instrument, in so far as it is an instrument, that it moves when moved. Hence, what *the complete form is to the independent agent*, that in the *instrument is the motion wherewith it is moved* by its principal."²

Let me sum up the argument:—(a) Every instrument gets force (*virtus*) from its principal. (b) This force is a thing incomplete in the scale of being. (c) The proof is, that it is but motion, and motion is incomplete. Therefore (d) force is motion.

Again:—(a) What the complete form is to an independent agent, that, in an instrument, is the motion wherewith it is moved. But, (b) the very same thing is the force which the instrument gets from the principal agent. Therefore, (c) force is motion.

I could not express my opinion in terms clearer than those which I find in that article of St. Thomas. And I would have you observe how the Saint's whole argument is based on the doctrine of Aristotle regarding motion.

¹ "Virtus non habet esse completum in natura, sed est quid incompletum in genere entis; quod patet ex hoc quod instrumentum movet in quantum movetur. Motus autem est actus imperfectus, secundum Philosophum (3 Phys. text. 15). Unde, sicut illa quae movent in quantum sunt jam quasi in termino motus assimilata agenti, movent per formam perfectam; ita illa quae movent prout sunt in ipso moveri movent per virtutem imperfectam."

² "Haec enim est ratio instrumenti, in quantum est instrumentum, ut moveat motum. Unde, sicut se habet forma completa ad per se agentem, ita se habet motus quo movetur a principali agente ad instrumentum."

IV.

It is beyond doubt the teaching of the Angelic Doctor, that not only are the sacraments instruments in the hands of God for the infusion of grace, but that even natural agents are able to do nothing whatever unless as instruments of His. The holy Doctor insists on this over and over, wherever he treats of what we are accustomed to call *the divine concurrence* (*concursus*), whether in the natural or in the supernatural order, and which he usually designates "the operation of God in creatures."¹

Accordingly, since every instrument acts, as such, only by means of a force (*virtus*) which it receives from its principal;² and as the creature produces its action, only as an instrument in the hands of God, it follows that God must infuse a force (*virtus*) into the creature, whenever it acts.

God would thus contribute to the action of a creature in four distinct ways:—(*a*) by giving the creature its faculty; (*b*) by constantly keeping the same in existence; (*c*) by infusing into it this force; and (*d*) by modifying the force thus infused, so as to give it a greater elevation of character than it would otherwise possess;—as a sculptor not only moves his chisel, but gives an artistic turn to the motion. Let us hear the holy Doctor speak for himself:—

"It should be known that there are many ways in which one thing may be said to be the cause of the action of another. First (*a*) when it gives the other the power (*virtus*) of acting. . . . And in this manner God performs all the actions of

¹ See the titles of the various articles on the subject: *e. g.* "Utrum Deus operetur in omni operante" (1, q. 105, art. 5): and "Utrum Deus operetur in operatione naturæ" (De Pot. q. 3, art. 7). Needless to say, the answer is affirmative in all such cases.

² See p. 46.

nature, because He has given to natural things the *faculties* whereby they are able to act. . . .

(b) "[God performs all these actions] not only as generating the faculty, . . . and not conserving it afterwards, but as continually keeping it in being. For He is the cause of the faculty he has given, not only as generator, with regard to its production, but also with regard to its continuance. So that He may be said to be the cause of the action, inasmuch as He causes the natural faculty and conserves it in being. For even in this second way a conserver of a faculty is said to perform an action,—as medicines that preserve the sight enable [one] to see.

(c) "But, as nothing moves or acts of itself, unless it be the immovable Mover, there is a third way in which one thing is said to be the cause of the action of another,—*inasmuch as it moves this to act*. By this is not understood the grant or the conservation of the active faculty, but the application of the faculty to action. Thus, a man is the cause of an incision made by a knife, *by this precisely*,—that *by moving the knife* he applies its edge to cut. And as an inferior agent does not act unless it be put in motion ;—for inferior bodies of this kind are able to alter only when altered themselves, whereas the heavens alter though themselves unaltered, so, however, that they do not move unless when moved,¹ and this process does not cease until God is reached ;—it necessarily follows that God is the cause of every single action of

¹ This will seem strange Physics to some of our modern scientists. But let them ask themselves how does gravitation arise, or chemical affinity; or how did the sun get the motion by means of which the earth has been energizing for so many ages,—with light and heat. Those who in recent times have given any thought to the matter, look to the ether as the probable source of these motions of gravitation and cohesion, on which those of light, heat, and perhaps electricity depend.

Now, if the ether were the heavenly substance to which St. Thomas refers, would not the Angelic Doctor be found to be quite up to date? And, remember, in these matters St. Thomas always follows his master, Aristotle. The only difference between the Saint and the most advanced physicists of our days, seems to be, that the former goes on to inquire how the ether got its motion; and—even though it never *got* it—how it could manage to *retain* it. May not the same question be asked even in the light of modern science?

every being in nature, *precisely as moving* and applying its faculty to act.

(d) "Further, we find that the order of effects is like the order of their causes, as is necessary by reason of the likeness of effect to cause. Now, a secondary cause cannot, by any virtue of its own, produce the effect of the primary, although it may serve as an instrument to be used by the primary in relation to that effect. For, an instrument is in some measure the cause of the effect produced by the principal agent; not by any form or force of its own, but in so far as *it participates in the force* of the principal cause *by its motion*. Thus, an axe is not by any form or force of its own the cause of the work of art it produces, but [is such a cause] by reason of the *force* of the artist who *moves* it, whose force it in a measure shares. Hence, there is a fourth way in which one thing is the cause of the action of another,—as a principal agent is the cause of the action of an instrument; and in this manner, also, God must be said to be the cause of every action of every being in nature."¹

It is manifest that the Angelic Doctor's teaching in this passage is, as has been stated, that God contributes to the action of creatures in four different ways:—first granting, then conserving the faculty; afterwards infusing force; which, moreover, in the infusion He elevates and directs.

¹ "Sciendum namque est, quod actionis alicujus rei res alia potest dici causa multipliciter. Uno modo [a] quia tribuit ei virtutem operandi, . . . et hoc modo Deus agit omnes actiones naturae, quia dedit rebus naturalibus virtutes per quas agere possunt, [b] non solum sicut generans virtutem tribuit gravi et levi, et eam ulterius non conservat, sed sicut continue tenens virtutem in esse; quia est causa virtutis collatae, non solum quantum ad fieri sicut generans, sed etiam quantum ad esse; ut sic possit dici Deus causa actionis in quantum causat et conservat virtutem naturalem in esse. Nam etiam alio modo conservans virtutem dicitur facere actionem, sicut dicitur quod medicinae conservantes visum faciunt videre. Sed quia nulla res per seipsum movet vel agit, nisi sit movens non motum; tertio modo [c] dicitur una res esse causa actionis alterius, *in quantum movet eam ad agendum*; in quo non intelligitur collatio aut conservatio virtutis activae, sed applicatio virtutis ad actionem; sicut homo est causa incisionis cultelli, *ex hoc ipso* quod applicat acumen cultelli ad incidendum, *movendo ipsum*. Et quia natura inferior agens non agit nisi mota, eo quod hujusmodi corpora

I will take it, therefore, that in the opinion of St. Thomas, God infuses force into the faculty, whenever it proceeds to act. Here, once more, we have the very thing, *force*, the constitution of which is the subject of our inquiry. Let us see whether St. Thomas thought it really different from motion,—a reality midway between the faculty and the movement produced.

Turning back, then, to the statement made by the Angelic Doctor, regarding the third mode of causation,—by reason of the infusion of this very force,—we find the following remarkable expressions:—"There is a third way in which one thing is said to be the cause of the action of another,—*inasmuch as it moves this to act.*" "Thus, a man is the cause of an incision made by a knife, *by this precisely*, that *by moving the knife* he applies its edge to cut." "God is the cause of every single action of every being in nature, *precisely as moving* and applying its faculty to act."

Explaining the fourth method, he continues:—"An instrument is in some measure the cause of the effect produced by the principal agent, *not by any form or force of its own*, but *in so far as it participates* in the force of the principal cause *by its motion.*" If one were to

inferiora sunt alterantia alterata; coelum autem est alterans non alteratum, et tamen non est movens nisi motum, et hoc non cessat quousque perveniatur ad Deum: sequitur de necessitate quod Deus sit causa actionis cujuslibet re naturalis, ut movens et applicans virtutem ad agendum. Sed ulterius [d] invenimus secundum ordinem causarum esse ordinem effectuum; quod necesse est propter similitudinem effectus et causae. Nec causa secunda potest in effectum causae primae per virtutem propriam, quamvis sit instrumentum causae primae respectu illius effectus. Instrumentum enim est causa quodammodo effectus principalis causae, non per formam vel virtutem propriam, sed in quantum *participat aliquid* de virtute principalis causae *per motum ejus*, sicut dolabra non est causa rei artificiatæ per formam vel virtutem propriam, sed per *virtutem* artificis *a quo movetur* et eam quodammodo participat. Unde quarto modo unum est causa actionis alterius, sicut principale agens est causa actionis instrumenti: et hoc modo etiam oportet dicere quod Deus est causa omnis actionis rei naturalis." *De Pot.* q. 3, a. 6, c.

search for words in which to convey the kinetic theory of instrumental causality, one could not find terms more suitable for the purpose than these.

Now I am well aware that nearly all the Dominican interpreters of St. Thomas have long contended that the motion of which the holy Doctor speaks in these and similar passages, is a kind of *transient quality*, which is the *cause* of true motion, and not true motion itself.¹ This view seems to have been invented by those writers for the purpose of supporting their theory of *Physical Pre-determination*,—a theory which, to my mind, is utterly inconsistent with the freedom of the human will. It would but confuse the issue, if I were to discuss the matter here: it will come in its own place, later on, in the Chapter on Free-will. There is all the less necessity for anticipating the discussion, as the Angelic Doctor has himself stated most formally, in at least three distinct passages, what precisely he understood by the infused *force-motion* on which he so often insists.

¹ The reader will bear in mind that, in the Peripatetic philosophy, true motion is of three kinds:—alteration, increase or diminution, and continuous local displacement. This last is the basis of the other two: there can be no change of either quality, or of quantity without local displacement. It is true, indeed, that in spiritual substances there can be no local rearrangement of parts; yet something analogous to local change must be conceived to take place within even the spiritual faculty, whenever it proceeds to act. Hence, in the formation of ideas, the intellect makes itself into an image (species) of the object; and something similar occurs when the will produces an act of love. We are utterly unable to imagine a thing forming itself into a new shape or image (species), unless by moving itself locally. It may be necessary to correct the concept; but the concept of local displacement is undoubtedly there,—not without an underlying reality. "Quia per sensibilia in cognitionem intelligibilium devenimus, operationes autem sensibiles sine motu non fiunt; inde est quod etiam operationes intelligibiles quasi motus quidam describuntur et secundum similitudinem diversorum motuum earum differentia assignatur. In motibus autem corporalibus perfectiores et primi sunt locales . . . Et ideo sub eorum similitudinem potissimae operationes intelligibiles describuntur." St. Thom. 2. 2. q. 180, a. 6 in c. See Chap. XII., iii., 5; Chap. XIV.

1. The first of these formal statements refers to the nature of actual grace, which no Catholic will deny to be an infused *force-motion* of the kind in question. In the *Summa Theologica* the Saint treats of this subject; and, among other questions, he asks “whether grace *is a quality* of the soul?” Here we have raised formally and distinctly the very point at issue all through this Essay. I am endeavouring to prove that the “virtue” in which actual grace consists, is a *motion* merely; others maintain that it is a “force,” meaning thereby, a *quality* which *causes motion*. Here is what St. Thomas says on the point:—

“Man is aided in two ways by the gratuitous will of God; first, inasmuch as *his soul is moved* by God to know, or love, or do, something; in which case this gratuitous effect of God in man *is not a quality*, but *a certain motion of the soul*; for ‘the act of a mover [*ἡ τοῦ κινητικοῦ ἐνέργεια*] in the thing moved is motion,’—as is said in the third book of the *Physics*, text 18.

“There is a second way in which man is aided by the gratuitous will of God,—when some *habitual gift* is infused by God into the soul . . . For He has so provided for His creatures in the natural order, that He not only moves them to natural acts, but gives them certain forms and faculties (virtutes), which are the principles of actions, and are of themselves inclined to such motions; and thus the motions wherewith they are moved by God, are made connatural and easy to the creatures. Much more, therefore, when He moves them to attain the eternal good of the supernatural order, does He infuse into them certain *forms* or supernatural *qualities*, by means of which they are agreeably and readily moved by Him to attain their eternal welfare. In this sense the gift of grace is a kind of quality.”¹

¹ “Dupliciter ex gratuita Dei voluntate homo adjuvatur: uno modo, in quantum anima hominis movetur a Deo ad aliquid cognoscendum, vel volendum, vel agendum; et hoc modo ipse gratuitus effectus in homine non est qualitas, sed motus quidam animae; ‘actus’ enim ‘moventis in moto est motus,’—ut dicitur in III. Phys., text. 18. Alio modo adjuvatur homo ex gratuita Dei voluntate, secundum quod aliquod habituale donum a Deo

It is hardly necessary to make any comment on this. The aid that God gives us to enable us to act supernaturally, is of two kinds. One is a *form* or supernatural *quality*,—something like the faculties of the soul, that may be quite quiescent. This is known in theology as *habitual grace*; and is, of course, a quality. The other aid is *actual*; it is the “virtue”—*force-motion*—that has been so often mentioned. But if you ask what is its essence; *it is not a quality*, but a *certain motion of the soul*; for, according to Aristotle, the *act of the mover* (ἡ τοῦ κινητικῶν ἐνέργεια) *in the thing moved, is motion*.¹ I could not possibly put my view in any plainer terms than these.

2. The second of three formal statements of what St. Thomas means by the *force-motion*, is universal;—it

animae infunditur;—Creaturis enim naturalibus sic providet, ut non solum moveat eas ad actus naturales, sed etiam largiatur eis formas et virtutes quasdam, quae sunt principia actuum, ut secundum seipsas inclinentur ad hujusmodi motus; et sic motus quibus a Deo moventur, fiunt creaturis connaturales et faciles . . . Multo igitur magis illis quos movet ad consequendum bonum supernaturale aeternum, infundit aliquas formas seu qualitates supernaturales, secundum quas suaviter et prompte ab ipso moveantur ad bonum aeternum consequendum. Et sic donum gratiae qualitas quaedam est.” (I, 2, q. 110, a. 2, in c.)

The passage of Aristotle's *Physics* referred to, is what has been already quoted in Chapter II. of this Essay;—“Motion is in the movable object, for it is its act; and it proceeds from the moving agent: but the act of the moving agent (ἡ τοῦ κινητικῶν ἐνέργεια) *is not different*.”

¹ The reader will not fail to observe how the Angelic Doctor bases his argument on the celebrated passage in which Aristotle identifies *motion* and *energy*. It may be well to remark, in connection with this question of actual grace, that where the habitual virtues are absent from the soul, it is quite plain that an actual motion of the supernatural order cannot be infused into the faculty, until this has been *qualified*,—that is, made capable of receiving such a motion. In this sense actual grace, *taken adequately*, as we say, *includes* a transient quality,—for those who have not the permanent habit already in the soul. It is not improbable that the confusion of thought among the later Thomists, arose from not remembering that this transient quality is not necessary where the permanent habit already exists; and, therefore, is not in itself the *motion* or *action* of the supernatural order.

applies to natural as well as to supernatural acts. It occurs in the treatise *De Potentia*, from which I have already quoted the passage regarding the four modes of divine co-operation.

When the holy Doctor has explained these four methods, he goes on, in the next article, to inquire "whether God operates in the operation of nature." And, as is usual with him, he puts in the first place the arguments that tell against the view he is about to adopt. Amongst others, he urges this objection ;—that if the creature has in itself the *faculty* or *power* of acting, it cannot be in need of any further infusion of force on God's part, to enable it to act. Nay, even though God were to infuse a new *force-quality*, it would follow, that, as the already existing permanent quality requires a second, this second would need a third ;—and so on in an infinite series : with the result that the unfortunate creature could not move itself at all.

Now, I really would like to know what could be said, in reply to this objection, by those who defend the theory that the divinely-infused *force-motion* is a quality distinct from the true motion which it is said to produce. So important a question is this, that I shall take care to return to it later on. Meanwhile, let us hear the answer of the Angelic Master :—

"The natural faculty [virtue], given to natural agents at their inception, is in them after the manner of a *form* that is *fixed* and *well-established* (*rata et firma*) in the substance. But that which is produced by God in the natural thing, whereby it *actually acts*, is only an *intention*, having but an *incomplete being*, somewhat as *colours are in the air*, and the force of art in the artist's instrument."¹

¹ "Virtus naturalis quae est rebus naturalibus in sua institutione collata, inest eis ut quaedam forma habens esse ratum et firmum in natura. Sed id quod a Deo fit in re naturali, quo actualiter agat, est ut intentio sola, habens esse quoddam incompletum, per modum quo colores sunt in aere, et virtus artis in instrumento artificis." (De Pot. q. 3, a. 7, ad 7.)

The meaning of the answer evidently is :—The creature has its *faculty*, and had it from the beginning ; but a *mere faculty* is of no use for purposes of motion, since, as such, it is at rest. An infant in the womb has the faculty of playing the piano ; and one who is sound asleep is all the time, in a most true sense, able to sing, or to discuss philosophical questions. If, therefore, in either case, the faculty is to come into *action*, it must get something in addition to itself. It must get *motion* ; it must be *stirred up*. This new element is not like a faculty ; for, if it were, it would be of no use for immediate action, as the faculty itself is unable to act immediately. The new element, accordingly, is something less complete and permanent ; it is an *intention* (*in-tentia*) ; it is what colour is in the ether ; not the permanent arrangement of the parts of a body, which is properly designated its *quality* of colour,—the *habitual power* which it has, even when quite at rest, of reflecting rays of red or blue ;—but the *actual transit* of the light-waves through the ether.¹ This being what the new element is—motion—it requires no additional infusion of any further element ; for motion being once infused, the creature is already moving, or in act.

Here, then, we have a second most formal and explicit statement, given by St. Thomas himself, as to what he understood to be the nature of the transient *force-motion* (*virtus*) infused by God into His creatures, whenever He moves them to act. It is *not a quality*, but a something much less complete,—an *intention*,—what actual colour is in the ether. If this is not true motion, what is it? And how is the true motion produced at

¹ The holy Doctor's Physics is at fault when he puts colour in the air. The actual waves of red or blue light are not in the air, but, as we suspect, in the ether. Observe, however, how he anticipated the moderns at least in making light consist in a mode of motion.

length, without the infusion of an infinite series of qualities, if it be not identical with this very *force-motion* which is infused by God into the permanent faculty? ¹

3. The third of the formal statements which I proposed to quote, is found in the Saint's *Commentary on the Physics of Aristotle*. In the third book of that famous treatise, the Philosopher discusses, as has been pointed out, the question, "whether action and *passio* are the same motion." After commenting on all the arguments urged by Aristotle for and against the view he adopts, the holy Doctor puts two of his own, of which the first is as follows:—"If action and *passio* are the one motion, and do not differ except notionally, as has been said, it would seem that they ought not to be two categories; for categories are classes of things."

In reply to this argument the Saint enters into an elaborate explanation, too long for quotation here. The concluding paragraph will be sufficient: it runs thus:—

"It is plain that though motion is one, yet the categories formed according to motion are two, after the manner in which predicamental denominations are derived from different external things. For an agent is one thing; from which, as from an external source, the predicament, *passio*, is drawn by way of denomination. The thing acted on is another; from which the agent is denominated. And thus the solution of

¹ Remark in the passage just quoted the word "intention,"—*i.e.*, *in-tendentia, motion to something*. It is the opposite of what is "ratum et firmum." It is also "a being incomplete," not with the incompleteness of a faculty, but something still more imperfect, best illustrated by the motion of light-waves. Recall here the extract already given (p. 46): "Motion is an imperfect act (*ἐνέργεια*), according to the Philosopher;" and remark the similarity of the two phrases: "an imperfect act," and a "being incomplete." Spiritual motions, such as those of the intellect and will of man, are *true* movements in their measure, though only *analogous* to those of matter; as God is a true spirit, person, substance; with true knowledge and love; though these terms, when predicated of Him, bear a meaning only analogous to that which they have when predicated of finite beings.

the first argument is plain: [that is, though motion is but one, yet it can be the basis of the two distinct categories, *action* and *passio*"].¹

The drift of the argument is:—It might seem from what had been said that action and *passio* should not be two categories, but one; inasmuch as they are the same thing, motion. It never occurred to the holy Doctor to say in reply, that motion is a *quality*, not an action or a *passio*. On the contrary, he admits the basis of the objection, and goes on to explain how motion, though not a quality, nor anything else but an action, may be a *passio* also, and form a category distinct.²

¹ It is impossible to translate these passages of St. Thomas except into a kind of English, that is scarcely a translation at all. The original is:—"Si actio et passio sint unus motus, et non differunt nisi secundum rationem, ut dictum est, videtur quod non debeant esse duo prædicamenta, cum prædicamenta sint genera rerum, . . . Sic igitur patet quod licet motus sit unus, tamen prædicamenta quæ sumuntur secundum motum sunt duo, secundum quod a diversis rebus exterioribus fiunt prædicamentales denominationes. Nam alia res est agens; a qua, sicut ab exteriori, sumitur per modum denominationis prædicamentum passionis. Et alia res est patiens; a qua denominatur agens. Et sic patet solutio primæ dubitationis." Phys. L. 3, Lect. 5, nn. 14, 16.

² In his treatment of the divine premotion Cardinal Zigliara distinguishes three things in all cases of instrumental causality, such, for instance, as heat-waves produced in a body that is exposed to the action of fire. There are, first, the *action* of the fire; next, the *reception* of this action in the body that is heated; and finally, the *heating action* of the body that has itself been heated by the fire. "In motione agentis quæ consideratur ut transiens, . . . sunt: 1. *motio-actio*, quatenus consideratur ut procedens ab agente motore (e.g., calefactio ignis); 2. *motio-passio*, quatenus consideratur actio moventis ut recepta in re quæ movetur (e.g., caleferi ligni ex ignis calefactione); . . . 3. *operatio* proprie dicta (e.g., lignum-caletactum-calefaciens), idest, actio consequens conjunctum ex recepto et recipiente, scil. ex subjecto in se recipiente *motionem-passionem*." Theol. 31, V: "*prænoto*."

The learned writer goes on to say that created agents do not act immediately with an immediateness of power (virtutis), "inasmuch as the motion whereby they actually operate, they have not from themselves, but from another cause; as wood does not heat unless [in so far as] it is heated." This is all very true, and exactly what is insisted on by the supporters of the kinetic theory of activity; as is also the Cardinal's.

V.

This will be a convenient place to consider a passage on which Dynamists are accustomed to rely in proof of their contention, that the *force-motion* to which St. Thomas so often refers, is represented by him as not a mere motion, but some kind of quality. It is, as far as I am aware, the only passage which they submit in direct proof of this contention of theirs. It is taken from the Commentary on the Distinctions, and refers to the "virtue" that is in the sacraments for the infusion of grace.

The holy Doctor objects, as usual, that if the sacraments had any such virtue, it should be reducible to some of the categories. But it is not so reducible; since it is not a quality and cannot be anything else. The answer is as follows:—

"The incomplete being which is in the soul is different from that which is divided into the ten categories; . . . and

teaching, from St. Thomas, that the *motio-actio* of the fire, and the *motio-passio* of the wood, are not really but only notionally distinct. I only wish Cardinal Zigliara were more explicit as to the nature of the distinction between the *motio-passio* and the *operation* of the heated wood. Are they also not really identical? If not, how does the operation and every part of it come immediately from God? Or, to use the Cardinal's own words, how is it true that "the motion whereby the wood actually operates, it has, not from itself, but from another cause?"

If, on the contrary, they are really the same, why does Cardinal Zigliara find fault with the Molinists (cf. l.c., and again 35, I, *in fine*) for supposing that the "act to which the will is reduced [from potentiality] by the divine premotion, is the very determination or operation of the will?" When the will has received the divine *motio-actio*, is it not really thereby in action, however the reception and the action may be distinguished in their formal concepts? Is not the reception really identical with the consequent operation; as in the case of wood heated by a fire, the motion produced in the wood by the fire, is the same heat-motion which in turn produces motion in other bodies? If, in the language of Aristotle and St. Thomas, "*actio et passio sunt idem motus*," is it not equally true that the *passio* and the *subsequent action* or *operation* are really the same thing? See Note II. at the end of Chap. IX.

accordingly, such incomplete entities, speaking *per se*, are not in any class, unless by reduction. Thus, motion, as far as concerns its substance, is reduced to the class in which are the terms of the motion, although it is placed in the category of *passio*, for as much as it imports an ordination of mover to the thing moved. Hence, also, this virtue which is in the sacraments is reduced to the class in which is found the complete virtue of the principal agent. This is quality, or it would be such if it were in a class at all ; for the uncreated virtue is not in any class.”¹

The argument deduced from this passage is, of course, to the effect, that the holy Doctor is treating of the *force-motion* so often referred to ; and expressly states that it is a quality, in so far as it can be classed at all. Therefore he does not teach that it is motion and nothing more.

My answer is, (1) that whatever St. Thomas may have thought about the nature of this sacramental *virtue*, he thought the same precisely of motion itself: “ *Motion* . . . is reduced to the class in which are the terms of the motion, although it is placed in the category of *passio*, for as much as it imports an ordination of mover to the thing moved.” If the sacramental *motion* “is reduced to the class in which its terms are”; and if it be thus excluded from *passio*; where will it find its place? In quality—the category in which its terms are located. Thus, sacramental motion is a quality in the same sense as the sacramental virtue is ; and the objection of the Dynamists only confirms the argument on which I have all along relied.

¹ “ Ens incompletum quod est in anima, dividitur contra ens distinctum per decem genera. . . . Et ideo talia entia incompleta, per se loquendo, non sunt in aliquo genere, nisi per reductionem, sicut motus, quantum ad suam substantiam, reducitur ad illud genus in quo sunt termini motus. . . . quamvis ponatur in praedicamento passionis secundum quod importat ordinationem moventis ad motum. . . . Unde et virtus haec quae est in sacramentis, reducitur ad id genus in quo est virtus completa principalis agentis, quae est qualitas ; vel in qua esset si in genere esset ; quia virtus increata non est in aliquo genere.” 4 Dist. I. q. I. a. 4, Sol. 2, ad I.

(2) Let me observe, moreover, that, as this sacramental motion is not natural, it cannot without special divine assistance, be infused into the external rite. But, as has been remarked already with regard to the supernatural motions of grace,¹ it is impossible to infuse a preternatural motion into a natural agent, unless the agent be first qualified to receive the motion. Hence, if one holds with St. Thomas, as I do,² that the sacraments have a physical power of producing effects of at least a preternatural character, one should hold also that the *exercise* of this power,—the preternatural motion,—is preceded by the infusion of a preternatural physical *quality* into the external rite. The rite which would otherwise be natural in its substance, and, as such, capable only of a natural motion, is thus elevated to the preternatural order, and becomes capable of a motion of a higher kind.

This being so, every sacrament in action has *both a quality and a motion*; as a faculty of the soul acting supernaturally under the influence of grace, is similarly endowed. Accordingly, the sacramental “virtue” of which St. Thomas is treating, when taken in its fullness (*adæquate sumpta*), is *both a quality and a motion*; so, however, that the quality is of itself inactive, and is reduced to action by the motion or force. It is of this latter alone that I am treating all through this Essay; my contention being, that, taking it precisely as it is in itself (*inadæquate*), it is motion, and nothing more. I maintain that throughout his writings the Angelic Doctor holds the same opinion; nor is this refuted by proving that there is infused into the sacrament a virtue which is not a motion but a quality.

For I also maintain that there is a quality infused into

¹ See p. 54, note 1.

² See Note at end of this Chapter.

the sacraments to support the motion, and that the quality so infused is rightly denominated their "virtue" (*virtus quasi-habitualis*). But I hold, in addition, that this quality is not the *force-motion* of which I have been speaking all through this Essay, and of which St. Thomas treats in the passages I have quoted. The *force-motion* is something added to the quality,—whereby this is reduced to actual action,—and not the quality itself.

It seems to me that the later Thomists have fallen into great confusion of thought, from not bearing in mind this distinction between the actual formal motion itself and the transient quality that must underlie it in those agents that have not a permanent quality already abiding in their faculty.

NOTE TO CHAPTER III.

The statement in the text (p. 61),—that I prefer the teaching of St. Thomas to that of Scotus and his school, with regard to the nature of the activity of the sacraments of the New Law,—calls for a brief explanation.

It is my conviction that these sacraments, with the probable exception of Matrimony, are physical efficient causes, not of sanctifying grace itself, but of a preternatural quality,—the sacramental character, or something similar,—to which, according to the ordination of God, the infusion of grace is immediately due. The proof is, that, otherwise, the character of the priesthood would not be, what undoubtedly is, a *physical power*, with a corresponding *physical activity*. Priests do not administer sacraments *merely* as delegates of Christ. They preach as his delegates, and their exercises of jurisdiction are of a similar character. But the power of orders is essentially different from that of jurisdiction,—as is manifest from the necessity of the two in the sacrament of Penance. In what does this essential difference consist if not in this, that the power of orders

is physical, whereas jurisdiction is but a moral delegation? Hence the reason why it is probable that Matrimony operates in a special manner is, because that sacrament is administered not by the power of orders.

Moreover, according to the best tradition in the Catholic schools, it is not only the external rite that causes the infusion of grace into the soul, but the character, which is also infused by three of the sacraments. It is to this character that the grace is due immediately; hence sacraments which have been validly but informally received, may revive, as long as the character remains, and the time of probation has not passed away. There are very strong reasons for thinking that a material element, such as a sacrament, cannot be elevated even by divine power to the dignity of being able to produce grace by its own immediate physical action. It is not so with regard to the infusion of a character; for the character is only preternatural, whereas grace is an entity of the strictly supernatural order.

St. Thomas expressly teaches that sanctification, like creation, is an incommunicable action of the Deity (*Opusc. contra Errores Graecorum*, Cap. 23; see p. 77). Hence, if a sacramental character were truly supernatural, it could not, any more than sanctifying grace, be infused by an external rite. That it is not supernatural, but only what by many at least is called *preternatural in substance*, is manifest from this, that a sacramental character gives no right of necessity either to the beatific vision itself, or to the means of obtaining it. Hence the character lasts in a soul that is damned, that has not the smallest radical title to the vision of God. See *infra* p. 103.

CHAPTER IV.

ST. THOMAS—(*Continued.*)

THE question with which I have been dealing is so fundamental in Philosophy and Theology, and the authority of St. Thomas on such questions is of such weight with Catholics, that I hope to be pardoned if I pursue the subject of the last chapter. The side-lights thus thrown on some of the most interesting questions in nature and grace will, I trust, be some compensation to the reader for any tediousness he may have to endure.

I.

When the holy Doctor has given that celebrated explanation, already quoted, of the four modes whereby one agent may contribute to the action of another, he goes on in the next article to make a statement of the very greatest importance. As this statement might seem at first sight to be directly opposed to my whole contention, I should like to give it special prominence, and to investigate thoroughly what it means.

The question which the Angelic Doctor has under consideration is, "whether God operates in the operation of the creatures." In accordance with his usual style, he first puts the objection to the opinion he is about to adopt; then in the body of the article, before replying to these arguments, he gives his own view, with the reasons on which it is based. The passage is as follows:—

"We must say that it is simply to be granted that God operates in every nature and will that acts. Some, however, not understanding this, have fallen into error, attributing to

God every operation of nature, in such manner that the natural thing would do nothing by its own power. . . .

"God may be said to operate in everything, inasmuch as everything needs His virtue, in order to act. . . . He operates immediately in every agent ; not, however, to the exclusion of an operation in the nature and in the will."¹

Thus the Angelic Doctor. His Dynamist interpreters contend that he plainly supposes here that there is in every agent a "*force*" really distinct from and productive of *Motion*. For, apart altogether from the reality that is infused by God into the faculty, whether it be "*force*" or motion, we find the holy Doctor plainly stating that there is a force emanating from the faculty itself, which must be distinct from motion, since it is its efficient cause. "Some have fallen into error, attributing to God every operation of nature, in such manner that the natural thing itself would do nothing of its own power." "God operates immediately in every agent, not, however, to the exclusion of an operation in the nature and in the will."

According to St. Thomas, therefore (it is urged), the faculty gives out a "*force*" of its own, whereby it contributes to its own motion; if, indeed, there be not two distinct motions or actions—one produced by God, the other by the faculty. Dynamists do not go so far as to advocate a second; though St. Thomas writes occasionally as if he believed there were two. For instance :—
"An instrument *has two actions*; one instrumental, whereby it operates, not by its own force, but in the

¹ "Respondeo, dicendum quod simpliciter concedendum est Deum operari in natura et voluntate operantibus. Sed quidam hoc non intelligentes in errorem inciderunt, attribuentes Deo hoc modo omnem naturae operationem, quod res penitus naturalis nihil ageret per virtutem propriam. . . . Potest dici quod Deus in qualibet re operatur, in quantum ejus virtute quaelibet res indiget ad agendum. . . . Ipse in quolibet operante immediate operatur, non exclusa operatione voluntatis et naturae." De Pot., q. 3, art. 7, c.

virtue of the principal agent ; the other its own, which belongs to it owing to its own form.”¹

Remarks of this kind in the writings of the Angelic Doctor, are to be understood as he intended them, not as if there were a real, and not merely a virtual distinction between the two acts. There can, however, be no question of virtual distinction in relation to the “forces” ; for one comes from God, whereas the other emanates from the faculty itself.

And, indeed, (it is further urged), whoever does not admit this, falls at once into Occasionalism, an error which, though revived in the time of Malebranche, was advocated long before by the Jewish philosophers of the Middle Ages ; as we are told here by St. Thomas himself. For, if everything is due to God, what is the creature but an occasion ? No Catholic should advocate a theory that has been so often and so definitely condemned.

I have endeavoured to the best of my power to do justice to the argument against me, let me now claim the liberty of saying something in my own defence.

II.

As for the charge of Occasionalism, I will let that pass for the present, having something to say about the matter in a subsequent chapter.²

The remainder of the argument, as far as I can see, amounts to this,—that according to St. Thomas, it is not God only who acts in creatures, inasmuch as the created

¹ “Instrumentum habet duas actiones ; unam instrumentalem, secundum quam operatur non in virtute propria, sed in virtute principalis agentis ; aliam autem habet actionem propriam, quae competit ei secundum propriam formam.” 3, q. 62, a. I., ad 2.

² See Chap. VIII.

faculty has an action of its own. The error to which the holy Doctor refers, consists in believing that "the natural thing can do nothing of its own power (*virtute propria*).” The creature is thus a true agent as well as God.

Now, who denies this? Not I, certainly, who have taken the greatest care to assert over and over, that by virtue of the motion it receives from its principal, the instrumental cause is truly active, efficient,—is truly endowed with *an action of its own*. Let us see how this may be.

What is it to have a force or an action *of one's own*? What is it to have *anything* of one's own? To be *one's own*, must a thing have its *origin* in one's self? Or may we *own* things which we have *received* from another?

A man's soul is his own; so are his body, his faculties; no one, however, would say they came from himself. The same is true of the money in one's purse, the books on one's table, the cattle in one's stalls. I do not find that emanation from within one's self is of the essence of ownership in such things. It may be different with regard to force or action; but is it not reasonable to ask for proof of the difference? If motion cannot be one's own, unless it be produced by a "force" really distinct from the motion and emanating from the faculty, then motion is peculiar, and one would think that an exception should be proved.

You may say that the examples given are those of substances, and with accidents it may be different. I did not know that the faculties of the soul are substances; but let us take other accidents. A man's existence is his own; so is his permanent, habitual strength of body; his colour, height, weight, time, place. Where did he get all these? Go through all the categories except action alone (which is the one in dispute), and you will

find that all belong, or may belong, to those who get them from without.

Take *quality*, for instance,—to which class Dynamists would reduce all “forces”;—where do we get our heat, colour, size, weight, unless from without? I say then, without fear of contradiction, that if an action or motion cannot be one’s own, unless it have its origin within one, it is an exception to the rule even of accidents, and the peculiarity should be proved.

I utterly deny that motion is not mine, once I have got it, if I have received it from another;—just as much as it is my heat, or weight, or colour; or as it is my intellect, or my health, or my existence. If it be Occasionalism to believe that “natural things can do nothing of their own force (*virtute propria*),” it is no more Occasionalism to say that they have got this force from God, than it is to say they got from the Creator their intellects or their wills. Both the faculty and the *force-motion* are communications of the divine virtue, as we have learned from the Angelic Doctor;¹ why should the faculty be one’s own, but the force-motion not so at all?

III.

I must not anticipate, however. The question before us is, what precisely St. Thomas means when he says that the created faculty has an operation and a force of its own. Does he mean that this created power is really different from that which, as he himself assures us, is infused by God? If he does, I give in. It is an essential portion of the kinetic theory, that force is nothing but motion, and that any *force-motion* that is in any creature, must have come in the first instant

¹ See p. 49.

from God. St. Thomas would contradict this directly, if he were found to teach, that there is either a motion or a "force" in the creature, which has not been infused into it from without. Where, however, does he say so? I have shown that the doctrine is not contained in the passage regarding Occasionalism: let us see whether we may not be able to throw some light on the holy Doctor's meaning, from other portions of his works.

To explain the manner in which God *co-operates* with His creatures in their actions, the Angelic Doctor makes use of a distinction to which those who have at any time undertaken to interpret his meaning, have attached the greatest importance. The concurrence of the divine and human agents in the production of effects, is *immediate on the part of each*. No other agent intervenes between the effect and either of the co-agents; yet this immediateness *is not quite the same for both*. In the case of God, it is an immediateness of *force* (*immediatio virtutis*); whereas in the case of the creature, it is merely one of *supposit* (*immediatio suppositi*). I do not know how better to convey what is meant by the term, *supposit*, than by saying that it is *the substance* that underlies and sustains force and all other accidents (*sub-positum*),—the substance, that is, when taken as a complete and independent whole.

The following are the holy Doctor's words:—

"If we consider the *supposits* that act, every created agent is immediate in relation to its effect. If, however, we consider the virtue (*virtus*) by which the action is performed, under this aspect the virtue of the superior agent is more immediate to the effect than that of the inferior; for, the inferior virtue is not connected with the effect unless by the virtue of the superior."¹

¹ "Si consideremus supposita agentia, quodlibet agens particulare est immediatum ad suum effectum. Si autem consideremus virtutem qua fit

I most earnestly entreat the reader to weigh these words very carefully, and say whether they can be interpreted to mean that the whole or any part of the forces by which effects are produced in creatures, proceeds from the created agent, without having been infused into it by God. To render the consideration more easy, I will transcribe the somewhat more brief form in which this distinction of the Angelic Doctor's is explained by Ferrariensis :—

“God causes the act of the will immediately with an immediateness of virtue, but not with an immediateness of *supposit*, as has been already shown with regard to the acts of other faculties also. On the other hand, the will causes the same volition immediately, with an immediateness of *supposit*, but *not with an immediateness of virtue*.”¹

Whoever would contend that according to St. Thomas created agents produce effects by means of a “force” emanating from their faculties, without having been infused into them from without,—whoever would favour this contention, has, in face of the passages just quoted, to ask himself the question, how does it come to pass that, as the virtue comes thus from the faculty, without having been infused into it by God, the virtue of the faculty is not as immediate to the effect as that of God.

For what is the immediate cause of the effect? *Virtue* of some kind—whether two virtues or but one, it does not

actio, sic virtus superioris causae erit immediatior effectui quam virtus inferioris. Nam virtus inferioris non conjungitur effectui nisi per virtutem superioris.” *De Pot.*, q. 3, art. 7, c.

¹ “Deus immediate causat actum voluntatis immediatione virtutis, non autem immediatione suppositi, sicut et de actibus aliarum virtutum superius ostensum est. Voluntas autem causat ipsam volitionem immediate immediatione suppositi, non autem immediatione virtutis.” *Lib. 3. Cont. Gent.* c. 89.

matter in the least, so far as the present question is concerned. If there be but one virtue, it is supposed, according to the dynamic theory, to come from the faculty, and to come without having been infused therein by God. In that case, the *virtue of the faculty* is manifestly immediate to the effect. Ferrariensis, however, assures us that St. Thomas teaches the contrary; as is manifest, indeed, from the holy Doctor's own words:—"The virtue of the superior agent is more immediate to the effect than that of the inferior [the faculty], for the inferior virtue [the faculty] *is not connected with the effect unless by the virtue of the superior.*" It is, therefore, as Ferrariensis says, the *supposit* of the creature, not its virtue, that immediately produces the effect.

If the virtue be regarded as double,—one divine, the other arising from the faculty, the question still remains: How is the former more proximate to the effect than the latter? Yet Ferrariensis says:—"The will causes the volition immediately with an immediateness of *supposit* but *not with an immediateness of virtue*"; and Ferrariensis is one of the two "copious streams" through which, according to the Holy Father, the teaching of the Angelic Doctor is conveyed to later times.

IV.

Fr. Dummermuth, who is, I understand, an advocate of the dynamic theory, explains this twofold immediateness in the following manner:—

"An operation which is immediate with an immediateness of virtue, occurs when the virtue of the agent is joined to its effect, without begging this junction from any other virtue. On the other hand, an operation is immediate with an

immediateness of *supposit*, when no subordinate *supposit* acts as co-agent, midway between the *supposit* that acts and its effect."¹

I have no fault to find with the second of these definitions, but only with the first. When "the virtue of the agent is joined to its effect," the union between the two is immediate, in the sense that there is no other virtue between that of the agent and its effect. So, at least, I understand the explanation, which a little further on is repeated in these words:—"Secondary causes operate through the medium of a divine virtue that joins their virtues to their own peculiar effects—joins them, that is, by moving them and applying them to act."² Inasmuch, therefore, as the divine virtue moves, and applies the virtue of the creature to act, and so joins it to its effect, it seems manifest that the junction between the effect and the virtue of the creature, is altogether immediate. If not, what is between them?

But, if the junction between the effect produced and the virtue of the creature, is immediate in this sense, how can the same virtue act but mediately in the sense of St. Thomas? Because (it is said) it had to be moved by the divine virtue. But, surely, this proves only that in making this motion the virtue of the creature *had not the initiative*; it by no means explains how the same virtue *is not immediate* to the effect. St. Thomas does not say merely that the creature *has to be moved* to act; he asserts that, even when thus moved, it does *not act*

¹ "Immediate operari immediate virtutis, contingit quando virtus agentis jungitur effectui, non mendicando talem conjunctionem ab aliqua alia virtute. Immediate autem operari immediate suppositi, est quando inter suppositum agens et effectum, nullum mediat suppositum subordinatum coagens." *S. Thomas et Doctrina Praemotionis Physicae*, p. 37.

² "Causae secundariae operantur mediante virtute divina conjungente virtutes earum ad proprios effectus, id est, movente et applicante eas ad agendum." *Ibid.*, p. 38.

with an immediateness of virtue. Does it not, I ask again, act with immediateness of virtue, if the virtue of the creature *is joined* by God *to the effect*? What is there, in that case, *between* the effect and the virtue of the created faculty?

Father Dummermuth says, moreover, that the virtue of the creature has to beg from the Creator its motion to and junction with the effect produced; and in that sense it produces the effect only mediately. The reason would seem to me to prove, on the contrary, that the divine virtue is but the mediate cause of the effect, since it acts only by applying an otherwise inefficient virtue of the creature. If the creature were to beg or borrow a divine virtue, and join to the effect the virtue thus borrowed, and not its own, then, indeed, it would act but mediately, as far as its own virtue would be concerned. But, if it borrows something whereby to join *its own virtue* to the effect, I fail to see how it acts but mediately as regards this virtue of its own. For, is it not the creature's own virtue and not that which it borrows, which is immediately united to the effect?

V.

How, then, are these immediateness and mediateness of virtue to be explained? Thus:—

1. The virtue of the creature referred to in St. Thomas's distinction, is the created *faculty*, which is one of the two virtues (*duplex vis*) which, according to the holy Doctor, are in every creature while it acts.¹ This *habitual virtue* is utterly inoperative until it gets an *actual virtue*,—a *force-motion*. Whence does this force-motion come? From God; who, as is admitted

¹ See page 43.

by all, infuses an actual virtue into the faculty, thereby reducing this to action. The habitual virtue, otherwise inoperative, is thus made actually efficient,—united to an effect. It is so united by an actual virtue or force-motion which is infused into it by God.

It is *the divine virtue alone*,—the force-motion thus infused,—*which is immediately joined to the effect*; and not either the faculty or anything squeezed out of it, as it were, by God. For, if God were merely to press the faculty, so as to make it give out a “force,” this “force” would be, at least, as immediate to the effect as that which is infused by God. It is, however, this latter only which is immediate according to St. Thomas.

2. Turning to the immediateness of *supposit*, we see that, in the light of this explanation, the teaching of the Angelic Doctor is most reasonable. For, the force that is infused by God into the faculty is not left without a subject (*supposit*), nor yet is it subjected in God Himself. It is subjected in the created faculty, into which it has been infused; it is *subjected* in the faculty, and *owned* by the owner of the faculty,—the created subject, or *supposit*. Hence the immediate *supposit*, or substance in which the action is sustained, is the created and not the uncreated substance; although it does not *emanate* from the creature, whether spontaneously or owing to pressure on the part of God; it is infused into the faculty, and conserved there by God alone.

3. The reader is now in a position to understand the true meaning of the following passage, which seems to be the source of Fr. Dummermuth's interpretation. He must have taken “the virtue of the inferior agent” to refer to its *force-motion*, not its faculty. It will be remembered that in the writings of St. Thomas the

word *virtus* signifies sometimes a faculty, sometimes a *force-motion* :—

“ If we consider the virtue [in general] by which an action is performed, the virtue [*force-motion*, not faculty] of the superior cause will be more immediate to the effect than the virtue [faculty] of the inferior. For, the inferior virtue [faculty] is not joined to the effect unless by the virtue [*force-motion*] of the superior. Hence it is said in the Book *On Causes*, that the virtue [*force-motion*] of the First Cause acts first on the thing produced, and enters into the same more vehemently.”¹

This passage is intelligible if explained as I have indicated ; otherwise it is impossible to understand how the virtue of the inferior agent is not immediate to the effect produced. That it is not, however, is a first principle in the philosophy of St. Thomas.²

VI.

Let me recall here the question proposed at the beginning of this chapter. It is, in what sense, according to St. Thomas, has the creature *an action of its own* (*virtus propria*). We have seen how the expression must be harmonized with another portion of the Saint's teaching, to the effect that the creature produces the effect immediately, not by *giving out* any “ force ” from

¹ “ Si consideremus virtutem qua fit actio, sic virtus superioris causae erit immediatior effectui quam virtus inferioris. Nam virtus inferior non conjungitur effectui nisi per virtutem superioris. Unde dicitur in Lib., *De causis*, quod virtus Causae Primae prius agit in causatum et vehementius ingreditur in ipsum.” *De Pot.*, q. 3, art. 7, c.

² The reader should bear in mind, in this connection, that the holy Doctor usually supposes the action of the creature to be vital, not mechanical. Vital force or motion, as we shall see, is infused by God alone ; such as is purely mechanical being transmitted by inferior agents. However, even this mechanical *force-motion* is God's, inasmuch as He conserves it perennially, by a kind of continual production, from the time it first began till it end,—if it ever end.

which the effect might immediately result, but by supporting a *force-motion* when infused by God. I will call your attention to just one other portion of the holy Doctor's philosophic system.

In connection with the co-operation of God with creatures, the Saint lays great stress on two points, which are really but two aspects of the same principle. He insists, in the first place, that there is a most true sense in which the creature *does not co-operate with God* in producing its effect ; meaning thereby to exclude from the created faculty any *partial simultaneous* activity. I know there are Catholic theologians of great name who deny that this is any portion of the system of St. Thomas. I am stating, however, what may be called the common teaching of the Catholic schools, and what is the undisputed tradition of the great order to which the Saint belonged.

To understand this part of the Angelic Doctor's system, one must be careful to bear always in mind, that on the other hand, he would never allow that the creature is not truly active, as well as God. We have seen him reject the Occasionalism of his time, and assert on the contrary that the created faculty *acts with a force of its own* (*virtute propria*). God also acts,—no doubt of that at all.

It would seem to follow that the *two agents contribute* to produce the effect, more or less, to borrow an illustration from Molina, as two horses combine to draw a boat. Each animal is the *partial* cause of the entire motion ; they act *simultaneously*, each giving out a *different* "force" or motion ; and acting thus together the boat is moved along. This might seem to agree well enough with the principles laid down. God acts ; so does the creature ; the two act together ; and the result ensues.

There must, however, be a flaw somewhere in the chain of reasoning ; for, the Angelic Doctor is at pains expressly to reject the conclusion, at least in the sense that the creature is a *partial*, efficient cause, *co-operating simultaneously* with God in the production of the effect. The following is one of the passages in which that doctrine is condemned :—

“ One thing may be said to co-operate with another in two ways. In the first it produces the same effect by a virtue [faculty] quite distinct ; as a servant co-operates with his master when he obeys the master’s orders ; or as an instrument co-operates with the artist by whom it is moved.

“ There is a second way in which one thing may be said to co-operate with another, in so far as with this it performs the same operation. Thus it might be said of *two who carry a weight*, or of *a number who draw a boat*, that one co-operates with the other.

“ According, therefore, to the first of these modes of co-operating, the creature may be said to co-operate with the Creator, as far as these effects are concerned which are produced by means of the creature. Not so, however, with regard to such effects as, like creation and sanctification, are produced immediately by God alone. The creature *does not co-operate in the second manner* with the Creator ; but the three divine Persons only co-operate thus with one another. Their operation is one and the same.” ¹

This extract seems to me distinct and decisive. The

¹ “ Aliquid dicitur cooperari alicui dupliciter. Uno modo, quia operatur ad eundem effectum, sed per aliam virtutem ; sicut minister domino, dum ejus praeceptis obedit ; et instrumentum artificis a quo movetur. Alio modo dicitur aliquid cooperari alicui, in quantum operatur eandem operationem cum ipso ; sicut si diceretur de duobus portantibus aliquod pondus, vel de pluribus trahentibus navem, quod unum alteri cooperatur. Secundum igitur primum modum creatura potest dici Creatori cooperari, quantum ad aliquos effectus qui fiunt mediante creatura ; non tamen quantum ad illos effectus qui sunt immediate a Deo, ut creatio et sanctificatio. Secundo autem modo creatura Creatori non cooperatur, sed solum tres Personae divinae sibi invicem cooperantur, quia earum est operatio una.” *Opusc. contra Errores Gracc.*, cap. 23.

creature *does not co-operate with the Creator so as to perform the same operation* with Him,—does not co-operate, I would have you remark, at any time, or in any case or circumstances. God and the creature *are never co-agents*, in the same sense as are those who carry the same weight, or draw the same boat. He rejects in the most decisive manner the partial simultaneous causality of Molina.

Now, if they do not co-operate, which must fall out? Not God, surely; for every effect is produced and sustained immediately by him. St. Thomas, at least, would not hear of mere mediate divine co-operation. It is the creature, therefore, that does not co-operate; yet it is truly active *virtute propria*. If its activity consists in giving out a “force” by means of which the effect is produced immediately, in what sense can it be said with truth that it does not co-operate as a partial cause with the Creator?

It does not make the slightest difference whether the “force” whereby the creature is supposed to produce the action, is emitted by the faculty *spontaneously*, as the Molinists would seem to hold, or *under pressure* of a divine *pre-motion*, as Father Dummermuth would prefer. The “force” is there in any case, quite distinct from the divinely infused virtue; both are terminated in the same effect. In what sense is it true that there is not a partial co-operation? This is a question I shall have to ask again, especially of the Thomistic theologians, when I come to discuss in a later chapter the consistency of the opinion they hold.¹

It will be seen at once how thoroughly consistent the Angelic Doctor's teaching is, if he be understood as saying that the creature acts by means of a force or

¹ See Chap. VI., iii.

motion which it *receives, sustains, and owns*, but *does not give out*. There is thus but one force, one operation, one motion. It is that which is infused by God into the created faculty, and kept there by Him as long as the action lasts. Being an accident, it needs to be supported by a substance ; and so it is sustained not by the divine substance from which it came, but by that of the creature into which it is infused. *Actus sunt suppositorum* : the action *belongs* to the *supposit* in which it is sustained. Hence the creature *has* this action and is thereby truly active—the action is its own. But it does not co-operate with God in any other way than this—it supports the motion which it has received from Him. In other words, there is in a most true sense no *co-operation* of the creature with the Creator ; because the creature produces the effect immediately, but only with the immediateness of a *supposit*, whereas the Creator produces the same effect immediately with an immediateness of virtue.

VII.

Looking back now over what I have been saying with regard to the Angelic Doctor's teaching on this question of the origin of motion, you will find that it may be all reduced to a proof of two propositions: (*a*) that no creature can act unless after it has received from God an actual force, which is in no way different from motion ; and (*b*) that when the creature has received this *force-motion*, its action does not even partially consist in giving out any force of its own, distinct from that which it received, but in sustaining, and therefore owning, the motion infused by God. These are the two main principles of the kinetic theory. If you think it has been proved that they are taught by

St. Thomas, you must also hold that, in this matter of the origin of motion, the Angelic Doctor is opposed to Dynamism.

I am well aware that it will be urged here, just as in connection with the teaching of Aristotle, that the word "motion," in the passages quoted from St. Thomas, does not mean change of place. Nor does the holy Doctor use the term to denote local movements *only*. It comprises all true motions, of which local changes are the first. I have already said that there can be no change either in the quality or quantity of matter, which does not affect the extension of the subject, and, therefore, its position in space.

According to the Angelic Doctor, therefore, the motion which is identical with force, is all true motion, local as well as the others, and before the rest. This is the kinetic as opposed to the dynamic theory.

¹ This point will be discussed more fully in Chap. XIV..

CHAPTER V.

THE COUNCIL OF TRENT.

I.

IN the decrees of the Council of Trent there are two celebrated passages, which have been often quoted, and will be quoted to the end, as quite decisive against the opinion I have been ascribing to St. Thomas, regarding the co-operation of God in the actions of His creatures. No treatment of the general question can be, to the mind of a Catholic, at all full or adequate, which does not take cognizance of these decrees. They are accordingly here submitted to the reader.

In the first of the two the Holy Council says :—

“[Adults are disposed for justification] in such manner that, God touching the heart of the man by the illumination of the Holy Spirit, *neither does the man himself do nothing*, receiving that inspiration, seeing that he can even reject it ; nor yet can he of his own free-will move himself to justice before God without grace.”

In the second passage the Holy Council is even more explicit :—

“If anyone shall say that the free-will of man, when moved and excited by God, *does not co-operate*, by assenting to God who excites and calls, in any way whereby it may dispose and prepare itself for the grace of justification ; or shall say that it cannot dissent, if it will ; but that *like an inanimate thing it does nothing at all*, and *holds itself merely passive* : let him be *anathema*.”¹

¹ “Qui per peccata a Deo aversi erant, per ejus excitantem atque adjuvantem gratiam ad convertendum se ad suam ipsorum justificationem, eidem gratiae libere assentiendo et coperando, disponantur : ita ut, tangente Deo cor hominis, per Sp. Sancti illuminationem, neque homo ipse nihil omnino agat, inspirationem illam recipiens, quippe qui illam et abjicere

It is easy to see how Dynamists can ring the changes on these passages, especially the second, for the purpose of impressing on timid souls the belief that the doctrine of activity by the possession and transmission of motion, was condemned as heretical in the time of Luther and Calvin. In the process of the justification of adults, though God moves the heart, "the man himself *does something*." Therefore, he does not merely *receive* and *retain* motion. This is even more clearly brought out in the canon. The will of man "is not *like an inanimate thing*, that *does nothing at all* and *holds itself merely passive*." Whoever says so, let him be anathema. Is not this the very principle that is being advocated all through this Essay?

Further still. These Tridentine decrees were not drawn up without present necessity. The anathema of the canon was not intended for man in general; it was aimed at a well-known doctrine of the leading champions of the new ideas. Let us go, then, to the works of Luther and Calvin, and we shall find that they were content to teach what is propounded in this Essay. They did not deny the permanent capacity of the creature to receive a motion from God; nor would they have the least objection to saying that, after its reception, the motion is possessed and owned by the created faculty. Indeed, that is precisely what they did say: see the references given so copiously by De Meyer, Ripalda, and others. In fact, the very illustration made use of by Luther, was just such as might emanate from the author

potest; neque tamen sine gratia Dei movere se ad justitiam coram illo libera sua voluntate potest." Sess. 6, c. 5, *De Justif.* "Si quis dixerit liberum hominis arbitrium a Deo motum et excitatum nihil cooperari assentiendo Deo excitanti atque vocanti, quo ad obtinendam justificationis gratiam se disponat ac praearet; neque posse dissentire si velit, sed veluti inanime quoddam nihil omnino agere, mereque passive se habere: anathema sit." *Ibid.*, can. 4.

of this Essay. The will of man, he said, under the influence of grace, is like a stone cast from the hand.¹ The stone has motion ; holds it and owns it ; is, therefore, active in the only sense in which Luther admitted activity in the created faculty. Here is precisely what is condemned in the Tridentine decrees. This, and much more to the same effect, is what one hears from the Catholic advocates of the dynamic theory.

II.

Let us see, then, what is really the value of those Tridentine decrees, as far as the question here at issue is concerned. I would ask the reader to remember that I am no advocate of mere passivity ; as I maintain strongly that, under the divine premotion, the creature is most truly active. What is more to the point, I not only regard the human will as free, but contend that the theory here propounded is the only safe way between Semi-pelagianism, on the one hand, and the Predestinarianism of Calvin on the other.

It is somewhat consoling to a Catholic theologian who has to face a charge of Calvinism, to reflect that he is not the first, nor will he be the last, to be forced to meet this very accusation. I open Billuart, and find the following, quoted from the works of Livinus de Meyer:—

“The error of Luther and Calvin, for which they were condemned by the Council of Trent, consisted in this, that they made God the total and adequate cause of our action, and denied that He and man are partial causes in the production of a salutary act. Now, the Thomists teach what is plainly the same thing. Therefore.”²

¹ See apud Billuart, *De Deo*, Diss. VIII., art. 4, sec. 4.

² “In eo errarunt Lutherus et Calvinus et a Concilio Trid. damnati sunt quod assererent Deum esse causam totalem et adaequatam actionis nostrae et negarent Deum et hominem esse causas partiales in producendo actu salutifero ; atque Thomistae idem plane docent. ergo.” *Loc. cit.*

It became very interesting to examine what Billuart had to say in defence of himself and his Order, against this charge of at least material heresy. His reply is worded a little more strongly than the refinement of our days will allow :—

“The major proposition, viz., that the error for which Luther and Calvin were condemned, consisted in their saying that grace, when of itself efficacious, is the total cause of the salutary act, and in their denying that the human will is, with God, a partial cause of the same,—this proposition has been characterized as *a most manifest lie*, by one of our Order, the most learned de Graveson, in a work which he dedicated to the Sovereign Pontiff.”¹

That strong expression,—“a most manifest lie,”—has not been italicized by me ; it is printed so by Billuart, who, no doubt, wished to signify how heartily he endorsed the epithet. Having thus laid his mind open as to what the Council of Trent did not condemn in Luther and Calvin, the Thomistic author goes on to state positively in what their error really consisted :—

“It consisted in their saying that efficacious grace is the total and adequate cause of the salutary act, in such manner that the human will does not freely co-operate in the least ; but either holds itself merely passive, according to Luther ; or acts of necessity and purely spontaneously, as Calvin would have it.”²

¹ “Majorem propositionem, nempe, errorem Lutheri et Calvini a Tridentino damnatum, in eo situm esse, quod dicerent gratiam per se efficacem esse totalem causam actus salutiferi, et negarent voluntatem humanam esse cum Deo illius causam partialem, *luculentissimum mendacium* vocat sapientissimus noster de Graveson, in opere dicato S. Pontifici.” *Ibid.*

² “Enimvero, in eo situs est error istorum haeresiarcharum a Tridentino damnatus, quod dicerent gratiam efficacem ita esse causam totalem et adequatam actus salutiferi, ut voluntas humana nullatenus ad illum libere concurreret ; sed vel se haberet passive, secundum Lutherum ; vel necessario et pure spontanee secundum Calvinum.” *Ibid.*

Here, accordingly, we come upon a clear and definite issue. Were the reformers condemned for denying that, under the influence of grace, the human faculty gives out a "force" which is both really distinct from the motion infused by God, and simultaneously with that motion a partial cause of the consequent action? Or was it because they went further and said that the faculty, under the influence of grace, is not active at all, but merely passive; nay, further, that even though the will be active, it is at least not free in the exercise of its activity? Billuart contends that the condemned doctrine took the second form, not the first; and his contention is backed by the whole Thomistic school.

Well, I maintain with the Thomists, that the human faculties are not merely passive, but truly active, under the influence of the divine premotion; nay, more, in the words of the first of these Tridentine decrees, I contend most strenuously that not only is a man "*active in receiving* the divine inspiration," but that "he can even reject it." If, therefore, the reply of the Thomists is sufficient to prove that their doctrine does not come within the scope of the Tridentine decrees, I make the same reply, and claim that the doctrine here advanced is equally free from censure.

III.

Of course, De Meyer and his party would not be taking full advantage of their position, if they failed to urge their point even against this defence of the Thomists. What, then, did Luther and Calvin hold? Did they deny that the creature is capable of *receiving* and *retaining* the divine premotion? Does not Calvin expressly admit the capacity of the created faculty in this sense? And did not Luther himself illustrate his

teaching by saying that, under the influence of grace, man is "like a stone thrown from the hand," which undoubtedly moves with a motion received from the thrower. Hence the second of these decrees—the canon—is directed against those who would represent the human will as "an inanimate thing that does nothing at all, but merely holds itself passive." It would seem, therefore, that, however ill-chosen was the form of words they used, the Reformers held that the will is able to receive the divine premotion, hold the same, but can add nothing of its own ; and that this is the inactivity or passivity which is condemned by the Council.

Here we have undoubtedly a fair rejoinder, such as the Thomists must meet, if they wish to be at liberty to hold their opinions. I regret to state that, as far as my judgment goes, Billuart, under a pretence of repelling this attack, seems to give up his whole position to the adversaries. I wonder is there any of the modern Thomists who will show here the courage of his convictions.

Billuart distinguishes two senses in which a thing may be said to be the total and adequate cause of an effect, according as it produces the effect with or without the aid of another. He then goes on :—

"The Thomists distinguish two things in the will ;—viz., its application to act, and the act itself, which it elicits by its own innate virtue. . . . Hence, although it be true that God alone is the cause why man is applied to convert himself, or why he converts himself by his free-will ; you cannot infer that God is the sole cause of this conversion. For it is produced by the created will, as a second total cause, together with God, *from its own innate virtue*, with full liberty of indifference, and expedite capacity for the contrary. . . . This, however, or anything like it, is what Luther or Calvin never said or could say ; inasmuch as, according to them, free-will,

is quite extinct in fallen man ; who is, as regards grace, either passive, as Luther says, or a merely spontaneous agent, as is the contention of Calvin."¹

As far as I can gather, the meaning of this reply of the Thomistic writer is, that, whereas Luther was rightly condemned for teaching the pure passivity of the faculty under the influence of grace, the Thomists are free from censure, holding as they do, that the faculty is truly active in the same circumstances. But how is it active? Because, when applied to act by the divine premotion, *it elicits the action* by "*its own innate virtue.*"

Now, the whole question turns on the nature of this "*innate virtue.*" Is it merely the *faculty*, which is capable of receiving and retaining the divine premotion? If so, it is contended that Luther himself would not deny such a capacity. Is the "*innate virtue,*" on the contrary, something *given out by the faculty*, under the pressure of the divine application,—which something co-operates with the divine motion in the immediate production of the act? But that is precisely what De Meyer wants to prove. Either, therefore, Billuart means by the "*innate virtue*" precisely what I mean,—the natural faculty (*virtus habitualis*), capable of receiving, retaining, and possessing the divine premotion ; or he gives away the whole position to his adversaries. If the faculty is able to *give out a "force"* under the pressure of the divine

¹ " Duo distinguunt Thomistae in voluntate, nempe ejus applicationem ad actum, et ipsum actum, quem ex propria et innata virtute elicit. . . . Unde, quamvis verum sit quod Deus solus sit causa cur homo applicetur ad se convertendum, seu se convertat per liberum arbitrium, male tamen inde inferres quod sit etiam solus causa hujus conversionis; hanc enim voluntas creata operatur cum Deo ut causa secunda totalis, ex propria et innata virtute, cum plena libertate indifferentiae, et potentia expedita ad oppositum . . . Id autem aut quid simile nunquam dixerunt seu dicere potuerunt Lutherus et Calvinus; juxta quos liberum arbitrium est penitus extinctum in homine lapso, et respectu gratiae se habet vel passive, ut dicit Lutherus, vel pure spontanee, ut dicit Calvinus." *Ibid.*

premotion, then why all the declamation against the partial causality advocated by Molina? Does not Billuart himself thus advocate a partial causality of the created with the uncreated virtue? Else, why should the created faculty give out an "innate virtue" at all?

IV.

I do not want to sail off under cover of a dubious phrase, such as "innate virtue." The only "innate virtue" possessed by the creature, in my opinion, is a faculty, capable of receiving motion, either immediately from God, or from its fellow-creature;—capable of receiving it, retaining it, and of at times transmitting it. The motion so received is, as St. Thomas always says, the *actual virtue* of the creature; it is *innate* only in the sense that it is often *natural*. The heat I get from the fire is not innate in me, in the sense of having been in me before I got it; or even in the sense that I had power *to produce* it within me. The only power I had was the power of receiving it from the coals; which themselves received it long ago from the sun; which, in turn, received it from God,—most probably through a long series of channels.

But, it is objected, Luther himself would not deny activity in this sense; as witness the illustration of the stone thrown from the hand. And the Council of Trent had evidently this teaching in view when it anathematized all who would maintain that the human will is "like an inanimate thing, able to do nothing at all, and capable merely of holding itself passive."

1. Now, it has struck me as something extraordinary, that champions of orthodoxy should be so ready to put a sacred ecumenical Council into a false—one would be tempted to say ridiculous—position. Can it be really

true that the Fathers of Trent, under the influence of the Holy Ghost, believed, and in an infallible canon expressed the belief, that "an inanimate thing does nothing at all, but merely holds itself passive"? Is not this doctrine rank Occasionalism?

Luther was condemned for teaching that the human will is "like an inanimate thing that does nothing at all, but is merely passive." Suppose he were to reply:—You forget that even inanimate things do something, and are not merely passive;—and, be it remembered, it is the contention of those who rely so much on this canon of Trent, that Luther was quite willing to admit all this;—if he did make that reply, in what a strange position the Fathers of the Council would have found themselves.

2. Moreover, what even though the will were passive, should it not be thereby active? Aristotle teaches, and the Angelic Doctor insists on the doctrine over and over,¹ that being acted on and acting are but the same motion under a different aspect; so that one could no more exist without the other than there could be a road from Thebes to Athens without a return way from Athens to Thebes. Were the Fathers of the Council so unfamiliar with the writings of St. Thomas as not to advert to this which he repeats so often?

In this connection, perhaps, it would not be too much to ask those interpreters of the Council, to look a little more sharply at the words of the chapter in question, and to remark in particular the following curious expression:—"Neither does the man himself do nothing, *receiving* the divine inspiration." *Doing* in *receiving*. Is it possible that, after all, the Council did recognise that *receiving* is a true *action*, and that one cannot be *moved* without *being in motion* or *moving*?

¹ See p. 25.

Take Luther's illustration of the stone thrown from the hand. We are asked to believe that the Council condemned him, not so much for maintaining, *totidem verbis*, that the human will is purely passive under the influence of grace ; but that this doctrine of passivity was condemned in a particular sense,—the sense of receiving and retaining motion, as a stone thrown from the hand receives and retains it. Suppose Luther were to reply, that when a stone has been thrown thus, it is not merely passive at all, but quite active, as the Fathers themselves must admit, and as any one would very quickly learn who would place his person in the path of the missile;—what could the Council say? What would you say, if you were asked to defend the position of the Fathers? You could and can say nothing but this, that the holy Council did not mean to convey that a stone thrown from the hand is altogether inactive ; but only that, whatever may be its condition, active or passive, at least the human will, under the influence of grace, is not passive merely,—does not do nothing, and is not, like the stone in the illustration, unable to abstain from its motion. If you can make any other defence for the Council than this, I should like to hear it.

The truth is, that the Fathers of Trent did not want to enter on, and did not enter on, abstruse discussions as to what precisely constitutes activity, passivity, liberty, and such things. They found certain errors being taught ;—that the will is not free ; that it is not even active, but passive ;—and they condemned these, knowing well that true philosophy could not but justify the condemnation. This is what happened over and over at the Council ; as, for example, in the case of the controversies as to the efficacy of the sacraments, the nature of the sacramental characters, the essence of

merit and of satisfaction, the conditions of transubstantiation, and innumerable similar instances. It was the avowed policy of the Council to eschew questions of Metaphysics, and to take instead the plain doctrines of the Church, measure with these the new theories mooted by the reformers, as they were commonly expressed by the reformers themselves, and condemn or permit accordingly.

In the case before us they found Luther and Calvin preaching that the will is not free; that it is not even active, but merely passive. The Fathers of Trent did not concern themselves with investigating what precise idea passivity or activity might convey to the mind of a bad philosopher, like Luther. What though, in his ignorance, he meant by passivity what is found in inanimate things, which are really active; damage is being done to the faith of Christians, all the same, under the cover of this puerile philosophy. We will, then, condemn this doctrine of passivity, and let Luther get out of the difficulty as best he may, by returning to more correct philosophical notions.

V.

But is it true that Luther was prepared to admit the activity of the human will, in the sense in which activity is explained in this Essay? So it is said by writers like De Meyer, De Graveson retorts, as we have seen, that De Meyer's assertion is—a *luculentissimum mendacium*. I am convinced that the latter is right; though I cannot sanction the use of such a strong expression.

The object which Luther and Calvin had in view, all through their writings on Grace, was, to do away once for all with the notion of merit or demerit, as belonging

to the actions of men ; thereby ascribing to God all the glory, as is right and proper ; and—what was more to their purpose, and is not right nor proper at all—freeing men from all sense of responsibility. They began by representing the human will as so corrupted in the fall of Adam, that men are not free to resist concupiscence. It was easy to conclude from this that there is neither merit nor demerit in human actions ; and that souls are saved or damned, not so much out of regard for what they may have done during life, as because God wants His hell and heaven not to lie useless.

For all the declamation with which these opinions were propounded, some must have found it difficult to resist the testimony of consciousness itself, proclaiming to them that they had each the power to act or not to act,—to do good or evil, just as it suited them. Here is where the divine premotion came in. These pusillanimous souls, it was argued, thought themselves free, when they were only free from coercion ; that they moved as they pleased, when they were only being gently borne along on a stream of divine activity. Why, not only were they not free, but they were not even active. This argument was decisive, indeed.

Thus Calvin says :—" If there were in us *even the least faculty*, there should be also some share of merit. But, to make us void [the Apostle] argues that there is nothing for merit."¹

How does this fit in with the theory that the reformers were willing to admit the activity of the human faculties, in the sense that they are able to receive and

¹ " Si quae esset vel minima in nobis facultas, aliqua etiam esset meriti portio ; verum, ut nos exinaniat, [Apostolus] nihil pro merito esse ratio-cinatur." *Inst.*, Lib. 2, cap. 5, sect. 6. Numberless texts might be quoted to the same effect.

retain divine premotions? The truth seems to be, that whilst Luther and Calvin freely allowed that men are able to sustain an infusion of divine activity, they strenuously contended that this did not make the human faculties in any true sense active. Not being active, they could not merit or demerit,—the very point for which the reformers were perpetually striving.

But, according to the kinetic theory, as it is propounded in this Essay, creatures are truly active, and not merely passive, in sustaining the motions they receive from without; and the human will is perfectly free to abstain from many of the motions thus infused into it. Hence, the kinetic theory, as here proposed, however true or false it may be found to be, is altogether different from the errors of Luther and Calvin. These, indeed, may have denied the existence of created “forces,” as distinct from motion; but, surely, all the doctrines even of Luther and Calvin are not heretical.

CHAPTER VI.

THOMISTS AND MOLINISTS.

THE reader will be glad to learn, that, notwithstanding the title of this chapter, it is not my intention to devote it to anything like a full discussion of the question *De Auxiliis*. I could not hope to decide even one of the many issues, small or great, which have been debated at such length and with so much ardour and learning, by those who, during the last three centuries, have taken part in that celebrated controversy. And yet it seems to me that there are fundamental principles connected with it, with regard to which all parties are agreed, and which throw not a little light on the nature of the relation that exists between faculties, forces, and motions. It is to some of these universally admitted principles that I propose to call your attention.

I.

First in scientific order is the principle of the immediate co-operation of God in every action of His creatures. All theologians agree in advocating this. No matter how the creature may have been endowed with faculties and “forces,” it cannot make the slightest movement without the immediate concurrence of the Prime Mover. If it should come to a conflict between this principle and any theory of activity, the theory, not the principle, will have to yield.

Now, it used to be one of the puzzles of my life, as long as I believed “force” to be an emanation of the faculty, different from motion, and, as such, not infused by God ;—it used to be an ever-recurring problem, how

to reconcile the necessity of the immediate divine co-operation with the existence of such a "force." I sought for reasons everywhere, but could not feel satisfied of the validity of any of those which are given by our philosophers and theologians. The best I found in Cardinal Zigliara's *Summa*; he quotes it from Liberatore, to whom it came in unbroken tradition through almost all the Catholic writers from St. Thomas. It is, therefore, an argument stamped with the approbation of both parties to the controversy *De Auxiliis*. The following is the form in which it is given by Zigliara:—

"Created things, when in action, are increased in some measure by that very exercise of activity, and are thus physically perfected, at least to some extent. For it manifestly is more to be *actually in action*, than *not to be in action yet*, but merely to *have the power* of acting.

"But, without the aid of a wealthier cause, nothing can *give itself* that by which it becomes richer in reality,—by which it is reduced from potentiality to act. Therefore, all created agents whatever require to be helped by some higher cause, if they are to act.

"Now, it is plain that this higher cause cannot be other than God, since it is He alone that is found to be outside the circle of created agents, and He alone comprises all perfection and reality in some eminent degree. Hence, the existence of God is validly proved from the necessity of a Prime Mover, who is Himself unmoved.

"Nor does it avail to reply, that created things are endowed with a sufficient activity, whereby they may elicit actions of their own energy, without needing any aid from the Supreme Cause. This activity of theirs proves, indeed, that when in action they really act; but it by no means excludes the necessity of divine assistance. Nay, it proves the very contrary.

"For, the power of acting possesses the action virtually only. Now, this virtual possession is plainly less than actual, which causes acquire, when they actually elicit an operation. Wherefore, every created activity is a mixture

of potentiality and act, inasmuch as it consists of power, indeed; so, however, that its efficacy is completed by the exercise of a further action."¹

To avoid misapprehension, I will say here, that, reading the argument as I do now, with my present notions of the origin of motion, I consider it absolutely conclusive:—A mere faculty, as such, is only in potentiality. Whenever it actually moves, its sum of reality is increased by the amount of the motion. Whence does the increase come? Not from within the faculty, for no being can enrich itself, even by a motion, without calling on another. The amount of increase,—the motion,—therefore, must come from without. In other words, the motion does not come from within the faculty, but is infused into the creature by an external agent. How this necessitates divine interference, I shall show later on.

¹ "Res creatae, dum agunt, ipso activitatis exercitio augescunt quodammodo, ac ratione aliqua saltem physice perficiuntur. Plus enim profecto est actu agere, quam nondum agere, sed sola agendi potestate gaudere. At vero nulla res sine locupletioris causae adminiculo largiri sibi potest id quod dicitur in realitate fit, et a potentia reducitur in actum. Ergo, efficientia quaevis creata, ut agant, ab altiori quadam causa juvari egent. Haec autem, ut perspicuum est, non nisi Deus esse potest, siquidem tantum Deus extra agentium creatorum ambitum reperitur, ac perfectionem omnem et realitatem eminenti quadam ratione complectitur. Hinc, . . . existentia Dei jure demonstratur sub conceptu primi moventis immobilis. Nec vero quis inquit res creatas sufficienti activitate instructas esse, cujus ope actiones eliciant marte suo, quin eisdem supremae causae subveniat adminiculum. Nam quod actuosae sunt, id optime probat eas in actionibus illis revera agere, at minime influxum Dei opitulantis excludit. Immo potius revera infert. Nam vis agendi virtute tantum actionem possidet. Haec autem virtualis possessio minor profecto est possessione actuali, quam causae acquirunt cum actu operationem eliciunt. Quare omnis creata activitas mixtio quaedam est potentiae et actus; quatenus vi quidem constat; sed ita constat, ut ejus efficacia exercitio actionis ulterius compleatur." *Theol.* (33), II.

The same argument is given in substance by Billuart (*de Gratia*, Diss. 5, art. 7, towards the end); indeed, by almost every writer on the subject.

Suppose, however, one were to hold with the Dynamists, that in every faculty there is a latent "force" which is really distinct from the faculty, and is, at least, *together with God*, the immediate principle of motion ;—if one were to hold this, how should one be affected by Liberatore's argument?

That there is an increase of reality in the creature, when its action is being performed, is beyond doubt in any hypothesis; the "force" that was previously latent is now no longer so. It has got action, and has increased thereby.

How is this increase brought about? Dynamists say by an external agent, *and* by the "latent" force. They have, however, to answer this objection: if the latent "force" is able to act at all, why can it not do so *without aid* from without? What answer are you prepared to give?

Liberatore contends that the latent "force" cannot act alone, because, "without the aid of a wealthier cause, nothing can give itself that by which it becomes richer in reality." In other words, nothing can give itself what it has not got to give. Quite true. But, when the external benefactor reaches forth his hand, can the thing which before *had nothing* to give, now *contribute* to the increase of reality? Can it merely *take what it gets*, or can it also *give of its own*? If, when left to its own resources, it had *nothing to give*, it has precisely the same nothing to contribute, when aided by the "richer cause," excepting always what it receives from this, and just in so far as it does receive.

Let me put this in another form. The faculty, owing to its latent "force," is supposed to be able to *contribute* to the action, once the external benefactor has lent his aid. Why, then, was it not able from the beginning to act of itself? It could not act, say the Dynamists,

because any action it could produce is an increase of store, and nothing can increase itself without taking in from outside. But, surely, neither can a thing *contribute to its own increase*, except in so far as it takes in from without? Think of a man, say, increasing his bulk, except by so much precisely as he *receives* into his system.

In other words, Dynamists are in this dilemma : either they must acknowledge that the faculty cannot *contribute* to its own increase,—which has been my contention all along ; or they must give up saying that it needs to be enriched from without, when actually eliciting an operation. If the latent “force” can help to perform the action, the question is, how do you prove that it cannot perform it alone? This question cries aloud for an answer, appealing to Thomists and Molinists alike.

II.

The Catholic doctrine regarding the necessity of immediate co-operation on the part of God in all the actions of creatures, is but an application to a particular class of entities—actions—of a principle which governs the relations of all finite beings whatsoever to the Infinite ; they must be produced immediately by God ; and, as long as they remain in existence, they must be kept in being by a continuation of the initial productive act. This is the doctrine of direct or immediate conservation of all things by the Creator. Hence the axiom that the conservation of complete substances is the continual creation of the same,—the initial creative action continued without interruption ; and this axiom applies equally to accidents of every kind,—with, however, a slight modification. For, as accidents are not said to be *created* but *produced* or *educed* at their inception ;

so they are kept in being by a continuance of an act of production which is not creation in the strict meaning of the word. This difference between creation and production is a technical one, which will be explained later on.¹ It does not affect the argument which I am about to propose ; as in the production of accidents as well as in the creation of complete substances, the whole of the effect produced and every portion of it, down to the very minutest, is the term of an immediate action on the part of God ; and the same action continued without interruption is the immediate cause of the continuance in existence of the effect originally brought into being. There is, therefore, no reality of any order whatever, which is not wholly and entirely produced immediately by God ; and wholly and entirely—down to the smallest fraction of its being—kept in existence by a continuance of the same divine action by which it was first brought out of possibility.

1. This is the teaching of all the Catholic philosophers,—with the exception of Durandus and one or two others. Liberatore very well says that the doctrine of immediate divine conservation of all things, and that of immediate co-operation on the part of God in all the actions of creatures, “fit into each other so, and are so bound together, that one cannot be repudiated without rejecting the other also. For, the principal necessity of the divine concurrence is derived from this, that no finite reality can fitly exist, unless in virtue of some positive divine influence exercised upon it. Conversely, if the effects of secondary causes do not depend, at the time of their production, on any divine influence, (and they would not depend on God, if they could be produced without His co-operation) ; neither would they after-

¹ See Chap. XIII., iv., 1.

wards, during their continuance, require to be conserved by Him."¹

Inasmuch, therefore, as all our theologians and philosophers have repudiated the teaching of Durandus, there cannot be the least doubt that the doctrine of the immediate conservation of all things by God,—of accidents as well as substances,—must be regarded as a Catholic doctrine in the technical sense of the word.

Consider, moreover, how the Catholic writers prove the necessity of this direct and positive divine intervention for the conservation of all things. Cardinal Zigliara argues, in the first place,—and this is the fundamental reason,—from the essential contingency of all things outside the Deity :—

"Inasmuch as creatures are contingent, they have the reason of their existence not in themselves but in another, that is, in God. But when they exist *de facto*, they do not therefore lose the character of contingency ; but exist so that it is possible for them not to exist, as, before they began to be, they were not in being so that it was possible for them to come into being. As, therefore, by reason of their contingency, they are in positive need of getting existence from another ; so, by reason of the same contingency, they require to be positively conserved in existence by that other."²

¹ "Quae duae sententiae ita inter se aptae videntur et colligatae, ut una nequeat repudiari, quin altera quoque rejiciatur. Praecipua enim necessitas divini concursus inde depromitur, quod congruenter nequeat finita ulla realitas exstare, nisi Deus affirmate in ipsam innuat. Vicissim, si effectus a causis secundis proficiscentes, dum gignuntur, ex nullo Dei pendent influxu, (et reapse non penderent si Deo non concurrente fierent) ; ne postea quidem, dum permanent, a Deo exigent conservari." (*Theol. Nat.* cap. iii., art. 2.)

² "Ex eo enim quod creaturae contingentes sunt, non in seipsis sed in alio, hoc est in Deo, rationem habent propriae existentiae. Cum vero de facto existunt, non propterea rationem contingentiae amittunt, sed sic sunt ut possint non esse, sicut antequam essent ita non erant ut possent esse. Sicut ergo vi contingentiae indigent positive habere existentiam ab alio, ita ratione ejusdem contingentiae indigent ut ab alio in existentia positive conserventur." (*Theol.* (29), iv.)

The necessity of the immediate conservation of created things by God, is thus as extensive as is the contingency of the creature. But everything outside God, substances and accidents of all kinds whatsoever, are contingent in their mode of being. Therefore, they all stand in need of direct and immediate divine conservation.

2. Let us, now, take one such reality,—the action by which a created agent is said to co-operate with God in producing effects. Dynamists contend that, in addition to the divine operation, there is a distinct action of the created faculty,—an action which is not infused into it nor kept there immediately by God, but emanates directly from the created faculty itself,—its own “*actio propria*.” Take that action, therefore; and let me ask you: is it produced at its inception immediately by God; and is it kept in being, as long as it lasts, by a continuation of this initial divine production? If it is not, what becomes of the principle of divine conservation of *all* contingent entities? And if it is, why do you object to saying that this very action of the created faculty,—distinct from the divine activity and co-operating simultaneously with it,—that this “*actio propria*” of the created faculty, is, at its inception, infused by God into the creature; and at every subsequent instant kept in being by a continuance of the initial productive act?

You may say that the “*actio propria*” of the faculty co-operates with the divine activity to produce an effect which is the same for both. But there is question not of any *effect* distinct from the action of the faculty, which may be produced simultaneously by that action and by the divine activity; but rather of the “*actio propria*” of the faculty considered in itself. It, also, is a contingent reality; and I ask again: is it produced immediately by God at its inception, and kept in existence, while it lasts, by a continuance of the initial productive act? If

so, why deny that God infuses into the faculty its own very action? And if you choose the other alternative, what becomes of the principle of immediate conservation of all things by God?

Some Dynamists, I know, will contend that there are not two actions, but only one; and that this is the *effect* produced immediately both by God and by the created faculty. But, an *effect*, of its nature, is the term of an action; it is something produced by the activity of an efficient cause. If a reality, such as a figure or a location, be not the term of an action, but arise by way of resultance, it is not an effect of the subject in which it is sustained. Thus, for instance, a man is not the efficient cause of the faculties of his soul.

Let us suppose, then, that there is but one action in the created faculty. It certainly is produced immediately, and conserved in existence by God; is it also an effect produced by the activity of the creature? If it is, then there must have been another action in the faculty antecedently; else how could the original action be an *effect* of the *activity* of the creature? There is, thus, within the faculty not one action but two,—one an effect of the other. Are you prepared to affirm this? If so, what about the antecedent action? Must not it also be produced immediately and simultaneously both by God and by the creature? And thus there will be within the faculty an infinite series of actions, one after the other, each the term or effect of its predecessor.¹

No: it cannot be that there is but one action in the faculty, in the hypothesis of simultaneous efficient causality: indeed the very term, *simultaneous activity*, excludes the possibility. And thus the original question returns: if the second action—the “*actio propria*” of

¹ See Chapter viii., p. 155.

the faculty—is not produced at its inception and kept in existence by God, what becomes of the doctrine of divine conservation?

Of what use, then, is “force” to a faculty? To enable it to give out an action? But, any action which the faculty may have, must in its entirety be produced and conserved immediately by the divine activity. Nay, would not the “force” itself, if there were any such reality, have to be infused at its inception by the Creator into the faculty, and kept in existence by a continuation of that infusion, as long as it—the “force”—should continue to exist? Even “force” cannot emanate from a faculty without being produced by God; else, you subvert the Catholic principle of the production and conservation of all things immediately by the Creator. Emanation itself is a reality, like resultance and action, and must follow the rule of all others, and be produced immediately by God.

III.

Another fundamental principle of Catholic Theology is that whereon is based our whole system of Grace. Let the reader ask himself on what precisely does he rely for proof of the Catholic dogma against the Pelagians. I refer not to any text of Scripture or definition of council; but to a philosophical principle, which may serve, by way of *ratio theologica*, to throw light on the revealed word of God. For my part, I have always understood the matter to stand thus:—

The object which is primarily supernatural, is the beatific vision. It is for the purpose of endowing us with a *right* to the intuitive vision of God,—to make this vision *due* to us,—that supernatural grace is infused into our souls. Human faculties and actions, left to themselves, may be entitled to lower rewards; but unless in

so far as they have been elevated by grace, they have no more *right* to the beatific vision, than to the hypostatic union itself.

Under the light of this principle, we have to decide as to what precisely it is in the supernatural actions of the Saints, which gives them this right to the beatific vision, in which their merit consists. As I understand the theory of the Dynamists, they say that every supernatural action has two parts: the first, an exercise of an infused divine virtue; the second being a motion of the "force" latent within the natural faculty itself.

I am aware of the contention that these two are not really, but only virtually, distinct. The Molinists, in the first place, are wont to maintain that God infuses nothing into the faculty; but merely acts on its latent "force," pressing it, as it were, in some peculiar way, so as to make it give out a supernatural rather than a mere natural motion. I would reply that this idea seems very foreign to the spirit that breathes in the prayers of the Church:—"pour forth (infunde), we beseech Thee, O Lord, Thy grace into our hearts;" where the object of the petition manifestly is, not merely habitual, but also actual grace. And, surely, the faculty, when it acts under the influence of grace, is an instrument in the hands of God; nor can it be reasonably denied that agents infuse something into the instruments by means of which they produce effects.

If, therefore, God does infuse actual grace into the soul, what is it that He infuses? Is it merely the action or motion of the faculty? That is what I have been all along contending for. It is, on the contrary, something that acts on the faculty,—pressing it, as it were, and thus making it to give out its action or motion? In that case, how can it be maintained against the Pelagians, that any

motion which may come from the faculty is of no use at all in the supernatural order?

But, it will be said, the faculty is supposed to be supernaturalized by what has been infused into it,—either habitual grace or a transient quality, at least. I admit it; though the contention is not a little inconsistent, coming from a Molinist. For, these theologians tell us at one time, that actual grace is nothing more than an action or motion of the soul; whilst they contend next moment that the same actual grace and free-will “constitute one adequate and proximate efficient *principle* of the salutary *action*” or motion.¹ How the one entity can be both a motion of the soul and the physical *principle* of the *same motion*, passes the wit of anyone not a Molinist to comprehend.

Let that be, however. I have no difficulty in admitting, for I hold it to be true in case of those who have no permanent supernatural virtues abiding in their faculties, that, before granting a supernatural motion, God must infuse into the faculty a quality which may suffice to fit it for the reception of such a motion. The question, then, is, whether it is from the supernatural quality thus infused, or from the “force” latent in the faculty itself, or from both, that the supernatural action immediately proceeds? If from the supernatural quality alone, then, of what use is the latent “force” of the faculty? If from the latent “force” alone, we have pure Pelagianism. And if it be said that the motion comes from the latent “force” *as well as* from the supernatural quality, how can we contend against the Pelagians that

¹ In the fifth Article of the first Disp. of his treatise *De Gratia*, Card. Mazzella teaches that actual grace is merely a motion or action of the soul. Nevertheless, in the seventh article of the same Disp., he lays down the following proposition:—“*Ex gratia et libero arbitrio unum constituitur adaequatum et proximum actus salutis efficiens principium.*”

the natural "force" of a created faculty, when left to itself, is utterly unable to produce a motion such as may have any proportion to the beatific vision?

It is able *to give out* a sufficient motion *concurrently* with the supernatural quality; how, then, do you prove that it may not do so alone? Left to itself, the latent "force" cannot move in the least towards the beatific vision; of what use, then, can its motion become, merely because it is concurrent with that of a quality distinct? The fact that the two are concurrent does not change the essence of either. If the motion is supernatural, it can come only from the supernatural principle; in so far as it comes from any "force" naturally latent in the faculty of the creature, it cannot be supernatural at all.

This is the foundation of the charge of equivalent Semi-Pelagianism that has been so often made, and is still made (by way of argument), against the teaching of the Molinists. Thus, Billuart writes:—

"This opinion seems to be akin to Semi-Pelagianism, inasmuch as it compounds with God, claiming part for Him and another part for the creature; and (what is worse) in such manner that the creature takes the first share, giving out from itself its own consent, in which the error of the Semi-Pelagians consisted, according to St. Augustine."¹

Let Molinists extricate themselves from this difficulty as best they may. They can, of course, confuse the issue by forms of words. What they have to explain, is, how a latent force, which of itself is able to give out only a natural "force" or motion, and not even that except under pressure from the First Cause, can, when acting in conjunction with a supernatural quality, or

¹ "Haec sententia videtur affinis Semi-Pelagianismo, quatenus componit cum Deo, partem homini vindicet et partem Deo, et quod pejus est, hominimum tollat, promendo ex se suum consensum, in quo, juxta S. August. situs erat error Semi-Pelagianorum." *De Gratia*, Diss. 5, art. 6, '*Probatur rationibus*,' 7.

without any such concurrent principle, give out an altogether different "force" or motion; and this though the quality co-operates merely by giving out from itself a "force" or motion altogether distinct.

I know they will say, among other things, that the latent "force" of the faculty and the supernatural infusion, are but one principle of action. But this supposes,—what is inconceivable, almost,—a unity of nature between the natural and the supernatural; for it is only what is *one in nature*, that can be *one immediate principle of action*. Moreover, even then, the natural latent "force" of the faculty would still contribute to the supernatural effect; and what is left us to say in reply to the argument which a Semi-Pelagian might urge against the Catholic dogma?¹

IV.

What shall I say of the Thomists, who are incessant in pressing against their opponents this very argument from partial causality? Are we to take it as portion of the new Thomism, that besides the motion infused by God into His creatures, whenever they become

¹ When I began to teach the treatise *De Gratia*, I used to propound what was substantially the doctrine of the Molinists, as to the nature of actual grace. Under pressure of the argument in the text, I was forced after a time to maintain that there are *two* motions in the will, when it acts under supernatural influence,—one quite natural, in the will itself; the other supernatural, in the infused supernatural transient quality or permanent virtue, as the case may be. I held that the natural act of the will contributes to salvation; just as the natural act of an organ of the body may;—becoming supernaturalized, not in itself, but only *denominative*, from being united with another supernatural action in the one person, whose actions of body and of soul are all made supernatural by the act of the infused supernatural quality, which covers them as a kind of form. It was a novel theory; but even now it seems to me to be more in conformity than is the doctrine of Molina with the teaching of the Church on Grace.

actually active, there is a "force" which "contributes" to the action, and which emanates,—of course, under pressure of the divine premotion,—immediately from the created faculty? Is the action or operation of the creature, the result, term, or effect,—whatever you wish to call it,—produced by two really distinct "forces," the divine premotion and a "force" emanating from the creature itself?

What, then, becomes of the volumes that have been written to prove that the partial causality of Molina is practically identical with Semi-Pelagianism? How is not the simultaneous concurrence of the divine premotion and this "force," which is thus represented as emanating from the creature, and as being really distinct from the divine influence,—how is not this mode of concurrence as partial as any with which Molina's name is connected?

Not a Thomist ever wrote on the question, as far as I know, who did not denounce as equivalent Semi-Pelagianism the doctrine of partial causality. "They compound with God," says Billuart, "claiming part for the creature, and (what is worse) in such manner that the creature takes the first share, giving out from itself its own consent; in which the error of the Semi-Pelagians consists, according to St. Augustine."¹ Is not this "composition with God"—this partial causality—the same in all essential matters, whether the divine concurrence be represented as previous or as merely simultaneous; whether the partial causes begin to operate simultaneously, or one begins and stimulates the other to action, continuing in action together with this? Is it not the essence of partial causality that there are *two forces* at work—two causes, each with a distinct

¹ See p. 106.

activity ; not as if one should supply the activity and the other support and sustain it, but each supplying from within itself a "force" different from any that it may receive from the co-operating agent immediately at the time the action takes place? As far as I can see any point in the charge of Semi-Pelagianism brought against the doctrine of Molina, it consists in this, that the creature can contribute to supernatural activity out of its own store of natural "force ;" and is not this the very doctrine which is being propounded by every Thomist who advocates the dynamic theory?

1. To illustrate my meaning, let me be permitted to call attention to the doctrine of simultaneous concurrence (*concursus simultaneus*) which Cardinal Zigliara has proposed in his *Summa Philosophica*, and which he represents as the recognised doctrine of the Thomistic schools. He puts himself the following objection :—

"If the divine concurrence were previous to the action of the creature, God would not influence that action immediately, but mediately. And, surely, since this divine concurrence is an action, it must produce in the creature something by which it [the action] may be proximately terminated. If, therefore, what it produces were distinct from and previous to the action of the creature, this action would proceed from God, only in so far as there proceeds from Him the previous reality by which the creature is assisted [in its operation]. God would, thus, not influence the action of the creature immediately, but by a medium of some kind [that is, by the previous reality which He infuses]."

Here is a plain difficulty : how does the action of the creature depend on God immediately, since its proximate cause is the divine premotion—a reality distinct from Himself—which God infuses into the created faculty? The reader will bear in mind the three stages which

Zigliara distinguishes in the motion of every created agent : the *motio-actio*, the *motio-passio*, and the *operation* properly so called. The second of these, the *motio-passio*, is what the learned Cardinal understands by the divine premotion ;¹ it is by it that God produces the operation. How, then, it is asked, does the operation depend immediately on God, since He does not produce it immediately but by means of the *motio-passio*, the premotion?

The Cardinal's answer is as follows:—

“ I distinguish the *antecedent*. If the concurrence [pre-motion] were to precede the action of the creature by an instant of time, as some kind of inactive quality, and were not to continue [in] the action of the creature itself, the divine concurrence would be mediate, *I admit*. But if it [the divine premotion] precede [the operation] with a priority of nature [only], and as a causality or motion which continues [in] the action of the creature, *I deny* [that the divine concurrence would be only mediate].”

In explanation of this distinction the learned writer goes on to say that the premotion

“ Is not a quality, which the created power [virtus, faculty] may make use of by itself and of itself to act ; as, for instance [a professor makes use of] his learning to teach ; but it is a motion or divine causality, which is received in the potentiality of the creature, reducing this to the act of being moved . . . But this causality, or motion, or divine influence, is not a mere impression of activity, or motion, or impulse, on the potentiality of the creature,—in the sense that it would move the power [faculty] of the creature, and then leave it in action. This sense, which seems to be the basis of the objection, is false. For, the previous influence is previous by reason of the [created] power, inasmuch as this is passively affected or moved ; but [the previous influence] does not [thereupon] cease ; as the previous motion [which an artisan]

¹ See (31), V., “ *patet au'cm, &c.*” ; cf. note p. 58 of this Essay.

gives to an axe, does not cease [when the axe is moved]. But [the divine premotion] continues and remains in the very operation of the creature . . . And inasmuch as the previous divine influence continues, it is simultaneous with the very action of the thing that is moved, and inwardly penetrates this very action of the same moving and acting being. For, it [the divine premotion] is immediate to the power [virtuti, the created faculty], inasmuch as it is previous; and it is immediate to the action, inasmuch as it continues [in] the action itself.”¹

The explanation seems to be, that God produces the operation of the creature immediately, inasmuch as His influence “continues in the operation.” But, surely, this gives rise to two other difficulties. In the first place, it must be admitted that the premotion, as it is received in the created faculty, is something really different from God. If, therefore, the operation of the faculty is different from the premotion, it—the operation—is produced by God only mediately. For, He produces it only by the premotion which He infuses into the faculty,—by the *motio-passio*, which is a creature. Wherefore, there is one creature, the operation, which God produces only by another, the premotion, as a medium. Now, Cardinal Zigliara finds fault with the

¹ “Si divinus concursus actionem creaturae praecederet, Deus in eam actionem non immediate influeret, sed mediate. Et sane concursus ille divinus, cum actio quaedam sit, aliquid in creatura produceret quo proxime terminaretur. Si igitur hoc, quod producit, distinctum esset ab actione creaturae, ipsique praeiret; actio creaturae hoc sensu tantum procederet a Deo, inquantum procedit a Deo praeivium illud per quod ipsa juvatur. Deus igitur non immediate sed per intermedium aliquod in eam actionem influeret.

“*Resp.* Distinguo *antecedens*: Si divinus concursus actionem creaturae praecederet prioritate temporis velut qualitas quaedam inactiva, et non continuaretur actioni ipsius creaturae, concursus divinus esset mediatius, *concedo*; si praecedat prioritate naturae et ut causalitas seu motus se continuans actioni creaturae, *nego*. . . Praevius influxus, quem sustinemus, non praecedit prioritate temporis actionem creaturarum, neque est qualitas qua virtus creata utatur per se et a se ad agendum, sicut e.g. doctrina ad

Molinists for maintaining that the operation and the divine premotion are the same reality. Hence, the difficulty remains: that, however the operation may be penetrated by the divine premotion, since it is only by means of this, which is a creature, that God produces the operation, His influence on the operation is only mediate,—through the premotion.

There is a second difficulty, which seems to me to be of even a more serious character, and it is this with which I am directly concerned. The Cardinal insists that “the previous divine influence continues in and is simultaneous with the very action of the thing which is moved.” I ask: is the action in question in any way really different from “the previous divine influence”? Is there something more in the action or operation of the creature than this influence which it receives from God? If there is, is there not partial causality; and is not this additional reality produced immediately, not by God, but by the created faculty? But if there is in the operation, as a whole, nothing but the influence which was received by the faculty from God, where is the “force” emanating from the faculty, for which Dynamists contend?

That “simultaneous continuance” of the divine

docendum, sed est *motus* seu causalitas divina recepta in potentialitate creaturae eamque reducens in actum qui est *moveri*. . . Atqui haec causalitas seu motus vel influxus divinus, non est mera impressio activitatis seu motus vel impulsus in potentialitatem creaturarum, quasi scil. potentiam creaturarum moveat et postea eam relinquat in agendo: nam sensus iste, quem arguens videtur in objectionem supponere, est falsus. Etenim praevious influxus est praevious ratione potentiae, quatenus haec passive afficitur seu movetur, sed non cessat, sicut non cessat praevious motus. impressus securi; sed continuatur et perdurat in operatione ipsa creaturae. . . . Et quatenus divinus influxus praevious continuatur, est simultaneous actioni ipsi rei motae, ipsamque actionem ejusdem rei motae et agentis intime penetrat; quia est immediatus virtuti, quatenus praevious est, et est immediatus actioni, quatenus ipsi actioni continuatur.” Theol. 34, I, *Obj. altera*.

influence in the operation is to me very suspicious. It seems to convey the impression that the operation of the creature is something more than the divine influence by which it is saturated,—a “force” or action of some kind, not received from God, but itself receiving and containing the divine influence, by means of which it is completed in the scale of causality. Cardinal Zigliara, as I have said, rebukes the Molinists more than once for holding that “the act to which the will is reduced by the divine premotion, is the very determination or operation of the will.”¹

Is there, then, a real difference between the two? If not, where is the “force” of the Dynamists? And if there is, why are Molinists alone to be condemned for the doctrine of partial causality? Do not they admit, just as freely as Cardinal Zigliara, that the action of the creature is stimulated by means of a divine premotion, which even saturates the faculty and its action; and that this divine premotion “continues in the action” of the faculty?²

¹ See 31, V. *Traditur*; 35, I, *Nunc autem*.

² Molina writes:—“Concursus Dei generalis ad actus naturales non est concursus Dei in liberum arbitrium ut causa est illorum actuum, quasi prius suscipiat in se motum, eoque applicetur et potens reddatur ad influendum in actum; sed est influxus immediatus una cum libero arbitrio in actum. Atvero auxilium gratiae *praevenientis*, ea ex parte qua *praeveniens est*, est influxus Dei in liberum arbitrium, quo illud movet et excitat, potensque reddit, ut eo pacto motum, tanquam habens jam in seipso principium efficiens actuum supernaturalium, simul influendo ulterius eos producat. . . . Gratia praeveniens, qua praeveniens est, *tempore vel natura antecedere solet* influxum liberi arbitrii ad actum supernaturalem.” (*Concord.* q. 14, a. 13, d. 41, *Ex hactenus, &c.*; See Mazzella, *De Gratia*, n. 211; Dummermuth, *S. Thomas et Doc. Praemot. Phys.*, p. 21). As prevenient grace is given to the intellect as well as to the will,—for the intellect also is stimulated or excited to its acts, when, for example, good thoughts are infused by God,—the foregoing texts cannot be explained as referring merely to graces that precede the *free* acts of the will as such. But, really, if one is prepared to admit that the grace of God precedes all our supernatural actions stimulating our faculties to operation,—and prevenient grace can mean

There is, indeed, a form of simultaneity which must be admitted, and which has been admitted traditionally in the Thomistic schools, in which the true activity of the creature has ever been defended. It is a co-operation whereby the Creator and the creature both contribute immediately, though in a different way, towards the production of the operation. The immediateness of one is that of a *supposit*; of the other it is that of *power*.¹ God supplies the power, which is not different from the action, motion, or operation; and which is truly sustained and supported by the substance of the creature. Both agents are thus truly active, yet is there no partial causality; nor is there in the creature the least reality, whether of faculty or of action, that is not produced in every instant by the immediate action of God.

2. Fr. Dummermuth distinguishes two kinds of simultaneity—one on the part of the cause, the other on the part of the effect:—

“Simultaneous concurrence on the part of the cause, is that whereby God co-operates as one partial cause with another in the production of the same effect; as, for instance, when two persons carry some weight; or, as Molina says, when two draw a boat.

“Simultaneous concurrence on the part of the effect, consists in this, that every effect needs the perpetual influence

nothing if not this,—it is almost inconceivable that one should hesitate to admit that this prevenient grace is a true premotion; that it is previous to the operation of the faculty, not indeed in time but in nature or in causality. In what sense is there a prevenient grace given to the intellect, if not in this? Hence some of the Molinists candidly admit the divine premotion. See Fr. Dummermuth, p. 19.

¹ The form consecrated by usage in the Thomistic schools, is: *Deus producit actionem creaturae immediate, immediatione virtutis; ipsa autem creatura immediatione suppositi*. See p. 69.

or concurrence of the First Cause ; that every event depends on God both in its beginning and in its duration."¹

Needless to say, the learned writer rejects simultaneity of the first kind in case of the co-operation of God with creatures. He advocates the second :—"It is evident that this is to be admitted ; for God's influence reaches not only to the causes, whilst He moves and applies them to act, but to the effect, which He immediately and totally produces."²

Now, I would ask Father Dummermuth to explain how concurrence of the second kind can be in any sense *simultaneous*, and yet not be so after the manner of the first. What is the meaning of a concurrence which is simultaneous merely on the part of the effect, and not on the part of the causes ? I can understand *simultaneity of effect* where *more effects than one* are produced. Here, however, there are more *causes than one*, but only a *single effect*. In this case, therefore, it is the causes only that are capable of simultaneity ; and accordingly any other form of simultaneity but that which is advocated by Molina, is in reality no simultaneity at all,—at least, on the supposition that the activity of the creature consists in the emission of "force."

If the "divine influence reaches to the effect, which it immediately and totally produces," and if, in addition, the creature gives out an activity which is applied by God to the same effect, it seems to me that we have the

¹ "Concursus simultaneus ex parte causae, est, quo Deus cum causa secunda concurrat, sicut una causa partialis cum altera ad eundem effectum producendum. Exemplum habetur in duobus portantibus aliquod pondus ; vel, ut dicit Molina, in duobus trahentibus navim. . . . Concursus simultaneus ex parte effectus in eo consistit quod effectus omnis perpetuo influxu seu concursu primae causae indiget, quod omnis effectus et in fieri et in facto esse a Deo dependeat." (*S. Thomas et Doct. Praemot. Phys.*, p. 108.)

² "Hunc influxum admittendum esse, est evidens : non solum enim Deus influit in causas, dum eas movet et applicat ad agendum, sed etiam in effectum, quem immediate et totaliter attingit." (*Ibid.*)

very thing for which Molina always contended,—two “forces” concurrently tending towards the same term, which is produced in its entirety by each, but of which each is only partially the cause.

3. It was not thus that the Thomists of a former time used to speak of the divine co-operation. They insisted, indeed, that “the divine influence reaches to the effect produced ;” but they never would acknowledge that the creature also gives out “force,” the only *raison d’être* of which is to co-operate with the divine premotion.

Cardinal Mazzela may be regarded as a hostile witness ; yet I cite him here as knowing something of the opinions which he undertakes to explain and to refute, especially as, owing to the brevity, yet fulness, of the statement he has made in a certain portion of his well-known Treatise on Grace, his words are particularly suitable for quotation. The question which he is discussing is:—“What is the character of the activity and influence which nature exercises on supernatural acts?” It is one form of the very question which I have been considering all through this Essay. Let us see, then, what his Eminence has to say in explanation of the teaching of the Thomists. He gives us to understand that the matter in dispute is the subject of one of the greatest controversies in scholastic theology ; yet our modern theologians will not admit that it affords ground for difference of opinion among Catholics :—

“The Thomists hold that nature has *only a radical and remote power* in relation to a salutary action ; whereas the theologians of our Society are unanimous in ascribing to it an activity which is proximate ; and in this they agree not only with Scotus and his school, but also with some of the older Thomists.”¹

¹ The Cardinal quotes Ripalda in proof of the last remark ; I imagine, however, Fr. Dummermuth would not admit the authority of this writer on such a question. For my part, I do not think Ripalda ever realized what precisely the early Thomists held.

“ However, lest there should be any verbal ambiguity, it is well to remark that there are two senses in which a remote or proximate activity may be ascribed to nature. For (1) all admit that the influence of nature on a salutary action is remote in this sense, that, of itself alone, it is not sufficient, even in the capacity of a proximately partial power : and it is thus, as it were, remote from the act, until it is completed by something. That is to say, nature requires that a power of grace should supervene, to complete it and elevate it, so as to make it capable of eliciting, with this grace, a salutary action.

(2) “ But *the question is*, whether the activity of nature is remote, inasmuch as, when once it has been elevated by grace, it elicits the salutary action *by means of the grace*, as by its *total and adequate power* ; or, on the contrary, should it rather be called proximate, inasmuch as, when it has been completed and elevated by grace, it produces the salutary action, not *merely* by the power of grace, but *also* by another *distinct power of its own* ; so that *this power belonging to nature, as well as grace*, is the partial cause of the action,— the proximate adequate principle of which is made up of both. *The Thomists hold the first alternative.* ‘ It is a question,’ says Gotti, ‘ whether, when the intellect elicits the [beatific] vision, it operates anything towards this *immediately by a virtue of its own* ; or rather is the light of glory the *only virtue* by which it proximately produces the vision, and the *sole and total proximate reason* of seeing God.’ And he establishes this conclusion : ‘ Although it be the intellect which sees God proximately and immediately, nevertheless, the *whole reason and proximate power* of seeing Him, is the *light of glory* ; so that the *intellect does not concur proximately, even partially, by any power of its own.*’¹

¹ “ Quae est indoles influxus et activitatis, quam natura exercet in actus supernaturales? Thomistae dicunt naturam non habere nisi vim *radicalem* et *remotam* respectu actus salutaris; theologi autem Societatis nostrae ad unum illi ascribunt *proximam* activitatem: atque in hoc conveniunt non solum cum Scoto et ejus schola; sed etiam cum veteribus quibusdam Thomistis.—Cf. Ripalda, (disp. 30, sect. 20, 21). At, ne ulla sit verborum ambiguitas, notandum est duplici sensu activitatem *remotam* vel *proximam* tribui posse naturae. Nam—(1) concedunt omnes vim naturae in actum

This language of Gotti's is apparently very different from that of Cardinal Zigliara, who would have us believe that the divine motion "continues in" the natural motion of the faculty. Gotti was not a believer in any simultaneity of really distinct actions; holding, as he did, that in the act of the beatific vision, "the intellect *does not concur* proximately, even partially, by any *power of its own*." In this he represents the universal Thomistic tradition, which allowed to nature only a remote and radical power in relation to salutary actions.¹

4. Whoever cares for further evidence on this point, will do well to study the famous thirty-first Disputation of Suarez' Commentary on the *Third Part* of the *Summa*. The Jesuit theologian and philosopher discusses most formally in that place, the nature of the obediential power whereby creatures are enabled to produce effects.

salutarem esse *remotam* eo sensu, quod per se sola non sufficit etiam in genere potentiae proximae partialis; et ita est quasi *remota ab actu*, donec per aliquid compleatur: exigit nempe natura supervenientem virtutem gratiae, qua compleatur et elevetur, ut possit cum illa actum salutarem efficere.—(2) Sed quaestio est, utrum naturae activitas sit *remota*, quatenus semel elevata per gratiam, per hanc tanquam per virtutem *totalem* et *adaequatam* efficiat actum salutarem; an, e contra, dicenda sit *proxima*, quatenus completa et elevata per gratiam influit in actum salutarem, non solum per virtutem gratiae, sed etiam per aliam distinctam virtutem sibi propriam, ita ut sicut gratia, ita virtus propria naturae sit causa partialis actus; et ex utraque exurgat principium ejus proximum adaequatum. Primum tenent Thomistae. 'Quaerimus,' inquit Gotti, 'an quando intellectus elicit visionem, operetur aliquid erga illam immediate propria virtute, an vero unica virtus, qua in visionem proxime agit, et unica totalis ratio proxima videndi Deum, sit lumen gloriae.' Et hanc statuit conclusionem: 'Esto intellectus sit, qui proxime, et immediate videt Deum, tota tamen ratio et virtus proxima videndi est lumen gloriae; ita ut intellectus propria et nativa virtute proxime non concurrat, adhuc partialiter.'" The italics of this Latin text are found in the original.

¹ The reader will bear in mind, in this connection, that, according to the Angelic Doctor, the created agent produces its effect immediately, indeed, but only with an immediateness of *supposit*, not of *power* or "*force*."

of the supernatural or of the preternatural order. The Thomists, he tells us, hold that this obediential power is *merely passive*,—a mere capacity to receive a new quality or new motion ; which when received, and subsisting in the creature, is *the sole immediate principle* of the supernatural action. According to this view, the created faculty acts but mediately,—through the infused supernatural quality or motion, which it receives and supports; somewhat as the substance of the soul is truly active in the formation of ideas, though it acts only mediately, through the intellect, which it does not produce, but rather receives and sustains. The teaching is quite in harmony with what we have just now heard from Gotti, regarding the proximate principle of the beatific vision.

But how does it harmonize with the theory of the exertion of “force” by the created faculty? God co-operates with the creature just as much in its natural, as in its supernatural actions; the *quality* of the concurrence only is changed in either case. If there is simultaneity in the natural order, there is the same in the supernatural ; so that in all salutary actions, in the operations of the sacraments, and in the preformance of miracles by the human nature of Christ, the divine motion, to use Cardinal Zigliara’s words, would “continue in” the action of the creature ; just as when a man walks or performs any other natural act. The natural forces of Christ’s humanity would, according to this, have worked side by side with a divine virtue, to produce miraculous results; the natural efficacy of washing with water, and of saying certain words, would be simultaneous with a divine influence in the production of baptismal grace. Are Thomists content to adopt this doctrine as that of their school?

These three classes of actions—the miraculous influences

of Christ's humanity, the physical operations of the sacraments, and the production of salutary acts by the powers of the soul, have always been placed on a perfect equality, as far as the obediential power of the creature is concerned. If the power is passive in one class, it is so in all three. Now, there is no doubt at all that, in the Thomistic schools, the obediential power of Christ's humanity, and of the sacramental rites, is passive. Why, then, are we asked by the new Thomists to believe that in the case of salutary actions it is active,—continuing together and acting simultaneously with the divine premotion? Are we to say that neither Christ's body nor the sacramental rite can be physical efficient causes of their effects, unless their natural actions also continue together with the powers infused into them by God,—unless the effects are produced, not only by the divinely infused virtue, but by means of "forces" emanating from the creature itself?

If the Thomists take up this new simultaneity of action, they will thereby, as it seems to me, separate themselves in a matter of principle from the best traditions of their school. No one doubts the immediateness of the divine premotion: the question for them to consider is, whether they are prepared to maintain, that, together with this motion, there is *another* action, by which, as well in supernatural as in natural operations, the creature exercises its own natural "force."

V.

Akin to the principle that the natural act of a creature is out of all proportion to the beatific vision, there is another to which I will now briefly refer, for the purpose of illustrating and enforcing what has just been said. This third principle is, that every true supernatural

action is supernatural in substance and in every portion of the same. Some theologians, it is true, have denied this ; but I believe all will now agree that whoever has any doubt as to the soundness of the principle, has not penetrated to the heart of the Catholic system of Grace.

Assuming, then, that all who know anything of the subject are agreed that supernatural actions are such through and through,—what becomes of this emanation of the latent “force” of the faculty? Is it natural or supernatural? It must be purely natural, for it is supposed to emanate from the faculty as such. But if a purely natural entity contributes to a motion, in what sense can the motion thus produced be said to be supernatural *through and through*?

I have already given what seems to me the only explanation that has even the appearance of sufficiency ;—that there is a third nature formed from the natural and the supernatural, somewhat as the human body is composed of matter and the soul. But will any one really contend that there is such a union between the latent “forces” of our faculties and the infused supernatural entities? And even though there were, would not the third entity thus formed, with its connatural motion, be altogether different in nature from the supernatural itself? Moreover, would not nature still contribute a portion of the resultant motion ; as the action of the human body could not be what it is, unless the soul and matter were what they are? But it is unnecessary to go on piling up inconveniences, as no Molinist would admit that there is in actual grace an infused quality of any kind, which could unite thus with either the faculty or its latent “force,” to beget a supernatural action. The infusion, in their system, consists of an action or motion and of that alone.

VI.

One other point may be called Catholic doctrine, it is so universally admitted :—that supernatural virtues are unable to act, unless aided by a further infusion of actual grace. Why is this,—seeing that the virtue makes the faculty *capable*? In other words, the virtue has a latent “force” proportionate to the act;—so we are given to understand by those who advocate the dynamic theory. Why, then, cannot this “force” spring into action? Because, they will tell you, it needs the co-operation of God. But why should it need this co-operation, if it be a “force” and capable? That is my question : how *do you prove* that the co-operation of God is necessary to such?

I am persuaded that the infused virtue is a mere *capacity of being moved* in a supernatural manner, and that the further actual grace which it needs, in order to actually operate, is the supernatural motion or action itself. This is intelligible, and fits in with the proof of the necessity of divine co-operation which Zigliara and Liberatore have given us from St. Thomas. But, if there be a “force” already existing latent in the virtue, why cannot it act at once?

One could go on indefinitely in this way piling up arguments based on principles universally admitted in every department of theology. I fear, however, the reader may have already got too much. One point only, in addition, I will mention. Those who insist on “force” as a reality distinct from motion, have done much to drive God out of science;—have given the Materialists their best answer to our arguments in proof of the existence of God; as they have given the Pelagians of our day a tangible ground for rejecting the supernatural. If there is “force” in matter independent

of and antecedent to the divine premotion, then the argument from the necessity of a Prime Mover is of little use. Liberatore tells us in the passage already quoted,¹ that the proof of the divine *concurrence* is one of our main arguments for the *existence* of God. I have shown how the "latent-force" theory does away with the necessity of divine co-operation; and the argument just referred to must stand or fall with that. This subject, however, is of sufficient importance to demand a chapter to itself.²

¹ See p. 95.

² See chapter xvii.

CHAPTER VII.

THE MODERNS.

IF one were asked when precisely the system or group of systems passing under the name of Modern Philosophy, began to be advocated in the schools of Europe, it would be difficult to give anything like a definite answer. Such changes begin almost imperceptibly, and pass slowly through their early stages, the new ideas being much in men's thoughts before issuing from their lips. Copernicus and Galileo must have set men thinking about many things; indeed, there must have been much thinking before either of themselves sat down to give expression to his thoughts. But how many soever may have contributed to the revolution in the empire of ideas, to Descartes must be ascribed the honour—or the reverse—of giving shape to the new philosophy.

It would be quite foreign to the scope of this Essay to enter minutely into the details of the system propounded by Descartes, or of the many changes that were introduced since his time, by those who are called the Leaders of Modern Thought. I am concerned only with substance and its "forces" or motions, and have got to investigate merely how these have been and are understood by the masters of the new school.

I.

In the Physics of Descartes there are two cardinal principles: (1) that the substance of material things is nothing more than extension; and (2) that this *extension in motion* is what is usually called "force." There is, thus, no such thing as substance underneath extension;

and between extension and motion there is no distinct reality, such as the "force" of the dynamic theory.

I need not say how utterly false, in my opinion, is the first of these two principles. There *is* something underneath extension, supporting it; as it, in turn, supports the motions it receives.

With regard to motion, however,—apart from what Descartes has said of the nature of motion in itself, and of the precise reason why it is transferable from one body to another,—I find myself in perfect agreement with him on two points. These are: (*a*) that mechanical motion is produced in bodies, not by any "force" that is really different from the motion itself and the substance in which it resides, but by a *passage* of motion from one body to another; and (*b*) that all merely mechanical movements, abstracting from such as have been produced miraculously, were infused into matter by God in the beginning; so that the sum of motion thus initially infused into the material universe, has remained the same ever since, in a most true sense of identity; so that no altogether new mechanical motion has been generated since the beginning, or ever will be generated, in conformity with natural laws.

I would have the reader observe the limitation in the expression, "altogether new." For, when motion has passed from one kind of body into another,—say, from wood into ivory in the case of the billiard-player,—it is no longer *quite* the same. The Peripatetic Philosophy recognises difference of kind in two such different substances as ivory and wood. In any system, indeed, it must be acknowledged that the motion of wood has a modification of its own, different from that of ivory; else, how should we be able to discriminate between the two?

New *modifications* of this kind must not be conceived

as *additions* to the amount of motion already existing in the object moved, as well as to the amount of motion it received in being moved. Rather, when motion passes from wood into ivory, and becomes ivory-motion rather than motion of wood; the difference is accounted for, not by the production of any new motion, or the annihilation of any portion already in existence; but by the fact that the wood-motion, on passing, leaves behind it the modification it had from the peculiar extension of the wood, and acquires a different modification from the peculiar extension of the ivory. We shall inquire, later on, whether anything similar takes place when substantial changes occur.

Bearing this explanation in mind, without, however, considering it absolutely essential, let us hear what Descartes says:—

“It is plain that God, in creating the world from the beginning, not only moved its different parts differently, but also contrived at the same time that they should impel one another, and so transfer their motions. So that by conserving the world now by the same action and with the same laws wherewith He first created it, He conserves motion, not attached always to the same portions of matter, but passing from part to part, according as the parts strike against one another.”¹

Apart from what occurs when substances are generated, especially when species are produced for the first time, (the treatment of which is reserved for a later chapter);² and limiting the question, for the present, to the

¹ “Perspicuum est Deum ab initio mundum creando, non modo diversas ejus partes diversimode movisse, sed simul etiam effecisse ut unae alias impellerent, motusque suos in alias transferrent; adeo ut jam ipsum conservando eadem actione ac etiam eisdem legibus cum quibus creavit, motum non iisdem materiae partibus semper infixum, sed ex unis in alias, prout sibi mutuo occurrunt, transeuntem conservet.” (Princ. Pars 2, n. 42.)

² See Chap. xiii.

mechanical movements which terminate in accidental forms; and, further, setting aside such accidental transformations as have been produced by special divine intervention; I believe this passage from Descartes expresses very correctly the opinion I wish to advocate.

II.

It is said that many of the Materialists of our time have used this teaching of Descartes as a basis for the doctrine which is ascribed to them, of the mere passivity of material things. Thus, Father Pesch writes :—

“There are in these times philosophers who say that all phenomena are to be reduced to local motion, thereby denying that things have any other action. It is the opinion of this school that the various motions which we perceive in bodies, have indeed a *material* and *receptive* principle in the body that is moved, but that there is not in them [the bodies] any *formal* and *active* principle [of these motions]. This they teach, either because they think that everything that happens in the world may be explained by means of *passive* motion alone (being moved, *moveri*), without any need of such as is *active* (putting in motion, *movere*); or [they teach it] because they imagine that the active principle not only of certain motions, but of all motions whatsoever, is something *outside* this world of sense, whether in God or in some other superior cause.”¹

¹ “Mirum non est exstitisse hisce temporibus philosophos, qui phenomena omnia ita ad motum localem revocanda esse dicant, ut aliam insuper actionem rebus denegent. Quorum ea est sententia, motus varios, quos in corporibus inesse videmus, habere quidem in corpore mobili principium *materiale* et *receptivum*, at principium *formale* et *activum* illis non inesse. Et id quidem docent, aut quia omnes mundi eventus per solum motum *passivum* (*moveri*), qui sine ullo motu sit *activo* (*movere*), explicari posse putant, aut quia non solum certorum quorundam, sed omnium omnino motuum principium activum *extra* hunc mundum sensibilem, sive in ipso Deo, sive in alia quapiam causa superiore, quaerendum esse ducunt.” *Instit. Phil. Nat.*, Lib. 1, Disp. 2, sect. 1. The italics are in the original.

Further on he remarks :—

“ Many of the French and German Materialists have altogether rejected from nature every active principle. They teach that the universe was from all eternity, and that it is itself nothing more than a certain local motion, which, inheres in ‘extension’ as in a subject. Nay, some in our day have attempted to resolve the extension, or matter itself, into local motion (‘moving points,’ ‘*puncta currentia*’).

“ Hence they affirm that there is nothing in the world but local motion transferred from one body to another, so that there would be no causality except such as is *material*. The root of this opinion is thought to be, that according to the testimony of experience and observation, all the phenomena of the world are various local motions; nor can it be admitted that anything is produced *de novo*, which is not in existence already.”¹

1. Now it seems to me that there must be a mistake somewhere in this. Of course it is impossible to calculate *a priori* on the vagaries of minds that have banished matter from the universe, and have made mere extension the basis of motion. By advocating that principle, Descartes did, indeed, open a way for many forms of error, culminating in the Idealism of the Germans and the Phenomenism of the English School.

But when it is a question of mere passivity or material causality in the universe of matter, I fail to perceive the

¹ “ Multi ex materialistis Gallis Germanisque omne omnino principium activum e natura ejecerunt, mundum universum inde ab aeterno fuisse docentes, qui mundus nihil sit nisi ipse motus quidam localis ‘extensioni’ tanquam subjecto inhaerens. Quin et nostra aetate aliqui ipsam etiam extensionem vel materiam in motum localem (‘*puncta currentia*’) resolvere conati sunt. Itaque nihil in mundo inesse affirmant nisi motum localem ab uno corpore in aliud corpus transmissum, ita et nullam praeter *materiam* causalitatem adesse dicant. Cujus sententiae radix in eo putatur esse, quod usu et observatione testibus omnia mundi phaenomena varii motus locales sint, neque admitti possit quidquam de novo fieri, quod antea non adfuerit.” (*Ibid.*, n. 56.)

connection indicated by Father Pesch. Do modern Materialists or Phenomenists deny active causality? Or, what is the same thing, do they advocate a causality merely of a material kind? A good deal, of course, will depend on what these terms are taken to mean.

By *material causality* I understand one of two things; either (a) that the material cause is a substance capable merely of sustaining a *shape or form*, as the *material of a statue* may be marble or bronze; or (b) that it is an accident capable of supporting a distinct *modification*, as general wave-motion of ether may be said to be the *material* of heat or light. In either case the fundamental idea is, that a material cause is something *underlying* and *supporting* a *form* or *modification* of some kind or other.

Now, the Materialists of this country, at least, do not maintain that matter, such as they understand it,—or *mass*, as they prefer to call it,—is merely capable of *sustaining* motion: it can *transmit* it as well. Even Father Pesch admits, in the second of the passages I have quoted, that the same is true of the Materialists of Germany and France. “They affirm that there is nothing in the world but local motion *transferred* from one body to another.” Capacity *to transfer motion* is very different from, and very much more than, the power merely of *sustaining* it. Hence Materialists would seem to advocate something more than mere material causality. I do not mean to contend that some of them may not be found to deny this. But, no matter what they say, if they hold that bodies have a capacity of transferring motion from one to another, they must hold that the same bodies are something more than material causes of the motions they transfer.

It used to be fashionable, in certain circles in England, to reject active causality, and to advocate instead a system of what was called, after Hume's time, *antecedent* and *consequent*. But, few men of science among us, if any, would now assert that the motion which is in certain consequents—say, billiard-balls—does not *come to them* from their antecedents, the cues. This is a distinct advance on antecedence and consequence; it is antecedence and consequence, and something more. We might have antecedence and consequence, even though the motion were not the same; whereas it is an integral portion of a principle now universally admitted by scientists,—the Conservation of Energy,—that motion continues the same after passing from one body to another. Hence there is now universally admitted, in scientific circles, something more than the antecedence and consequence of Hume.

I have no doubt that many of our men of science, if asked whether in this they recognise what is known as active causality, might reply in the negative. The reason, however, is, as I suspect, because they understand by active causality the interference of a “force,” such as is understood to come into operation according to the dynamic theory. In other words, when the Moderns deny the relation of active causality, they intend to convey merely that they are not Dynamists. If you go on to ask whether they recognise any *influence* (*influxus*) of or from one body into another, you will find that, almost to a man, they will answer in the affirmative. They recognise the *passage* (*influxus*) of *motion*. The question you have to ask yourself, then, is, whether a being that is able not only to *sustain* motion in itself, but to *transfer* it to another, is, when it so transfers the motion, anything more than a material cause. If it is more, what kind of cause is it? Not a

final, nor a formal cause, surely ; efficient or active causality alone remains.

2. In the first of the two passages I have quoted, Father Pesch makes another statement with regard to which I should like to offer a brief remark. The statement is to the effect that, according to the Materialists, "everything that happens in the world may be explained by means of passive motion alone (being moved, *moveri*), without any need of such as is active (putting in motion, *movere*).” In conformity with this, the Materialists are represented all through the learned Father’s dissertation, as advocating the utter passivity of matter.

Now, we Catholics ought to be fair, nay generous, even to Materialists. We shall never convince men by merely tripping them up in terminology ; still less, if we do not do full justice to their views. It is mere passivity to *receive* motion from another ; is it quite the same to *transfer* it to a third ? Now, the Materialists hold that bodies are capable of *both* ; and if they say, in their ignorance of philosophic terminology, that, in their system, matter is merely passive and not active, they say so, not knowing the full signification of the words they use. It is not generous, to say the least, to bind them to such mistakes. Father Pesch is more to my liking when, in arguing against these adversaries, he proves—most conclusively—that they themselves do not believe in this mere passivity of matter. Thus he writes :—

“ In the opinion of the adversaries, motion should be said to cause after the manner of a *material cause*. This, however, cannot be, since a material cause produces its effect [Query : do *material* causes, as such, *produce* effects ?] so as to be in some way consumed in it. But passive motion does not

thus cause the changes that occur in the world ; for it is not consumed but transmitted whole and entire."¹

If the Materialists thus contend for what is in reality activity in matter, they should get credit for it in the statement of the question.

III.

I have wandered somewhat away from Descartes, from whom the Materialists are said to have got their principles. The publication of his *Principia* occasioned in the mind of Europe almost as great a commotion as did the controversy *De Auxiliis* a little before. Men of science everywhere joined issue with one another ; but apart from the advocates of the old philosophy, the protagonists of the new opinions were undoubtedly three,—Gassendi, Leibnitz, and Newton.

It matters little for the purposes of this inquiry what were the details of the various systems advocated by these, or by any of those who took part, or still take part, in this celebrated controversy. We have to do merely with the relations between substance, force, and motion.

1. It will be within the recollection of the reader, that according to Descartes, there is no material substance really distinct from extension, as there is no "force" really different from motion. Gassendi controverted both of these points, maintaining that underneath extension there is material substance-matter ; and that this substance produces motion by means of "forces"

¹ " In sententia adversariorum motus causa dici debet ad modum causae materialis. Atqui hoc dici non potest, cum causa materialis ita effectum producat, ut tota quadamtenus in illa consumatur. At motus passivus non hoc modo causat mutationes quae in mundo eveniunt ; non enim consumitur, sed totus atque integer transmittitur." (l. c. n. 61.)

wherewith it is endowed. It may be well to remark that, in connection with these principles, Gassendi maintained that there are pure vacua between the various portions of matter ; these vacua, however, do not interfere with the operation of material "forces," which are thus supposed to be able to act at a distance.

2. The capacity for acting at a distance is the weakest point in Gassendi's system. This was perceived by Leibnitz, who would have all space filled with ether. The ether of Leibnitz, however, differed from the luminiferous medium which has been insisted on so much of late ; for the ether of Leibnitz was pure "force,"—of its nature always actually in action. Nay, this philosopher soon went so far as to deny altogether the existence of material substance, which he represented as not being really distinct from these actually active "forces." Later still he asserted that the various "forces," or particles or bundles of "forces," are incapable of mutual interaction ; so that in place of the extension and motion advocated by Descartes, Leibnitz would have us believe in motions and "forces,"—the latter being variously combined in the various forms of matter ; and each particle capable of moving itself, but quite incapable of either transferring motion to or causing motion in its fellows.

3. The strong common sense of Newton saved him from these extreme views. He saw quite clearly that there is something underneath extension which both moves and causes motion. He was convinced, moreover, that force is an accident, no less than extension ; and that, accordingly, it requires a subject by which it may be sustained. This led him to return to the matter and forces of Gassendi, and he agreed with that philosopher in admitting, what is so manifest to common sense, that material substances are capable of causing motion in

others. The other portion of Gassendi's theory,—the possibility of action at a distance,—was altogether opposed to the bent of Newton's genius :—

“That one body, [he writes] may act upon another at a distance, through a vacuum, without the mediation of anything else, by and through which their action may be conveyed from one to another, is to me so great an absurdity that I believe no man, who has in philosophical matters a competent faculty of thinking, can ever fall into it. Gravity must be caused by an agent acting constantly according to certain laws ; but, whether this agent be material or immaterial, I have left to the consideration of my readers.”¹

For an explanation of the phenomena of gravitation Newton seems to have looked to the universally diffused ether, agreeing with Leibnitz as regards the existence of some reality of that kind. At the end of the *Scholion Generale* to his *Principia*, Newton refers to a “very subtle spirit” of some kind, which may pervade all bodies ; and in the twenty-first of the “Queries” which he appended to his work on *Opticks*, he adds :—

“Is not this medium much rarer within the dense bodies of the sun, stars, planets, and comets, than in the empty celestial spaces between them? And in passing from them to great distances, doth it not grow denser and denser perpetually, and thereby cause the gravity of those great bodies towards one another, and of their parts towards the bodies ; every body endeavouring to go from the denser parts of the medium towards the rarer.”

This brought Newton very near the kinetic theory, as it has been recently propounded, which, indeed, he must have had pretty distinctly before his mind. There were two obstacles to his acceptance of the theory in its entirety.

¹ *Third Letter to Bentley* : see Stallo's *Concepts of Modern Physics*, Ch. 5, p. 53.

In the first place, as is well known, he could not see his way to admit the undulatory theory of light, being persuaded that light-waves, like those of sound, should gradually spread in all directions, and thus interfere with the well-known phenomena of shadows. Hence he preferred to believe that light is produced by the emission of tiny corpuscles of some kind from luminous substances. Moreover, he seems to have been persuaded that, however attractions—of gravity, magnetism, and such-like—may be due to impulsions conveyed by the universally diffused ether, these very impulsions postulate “forces” of some kind in the impelling agents.

Recent inquiries as to the direction taken by undulatory movements have convinced physicists that there was no real ground for the apprehensions which induced Newton to adopt the emission rather than the undulatory theory of light; and I shall try to show, in a later chapter,¹ that he was equally mistaken as to the necessity of what are called “forces” for the production of motion by impulse.

It will be seen from all this that those who rejected Descartes’ doctrine of activity by means of the transfer of motion, were very much divided in their own views as to how the phenomena of the universe are to be explained. In England, owing in great part to the authority of Newton, dynamic notions prevailed. With them was combined the emission theory of the generation of qualities, with the result that chemists were forced to have recourse to *phlogiston* and other imponderable agents. The emission theory became at length so complicated as to excite suspicion; and, at the same time, doubts were entertained by physicists as to the existence of these imponderable substances.²

¹ See ch. x.

² See *The New Chemistry*, by Josiah P. Cooke, p 113

IV.

Such was the state of things at the beginning of the present century, when Dalton gave form to the atomic theory. It is needless to say that the new theory,—or, to speak more precisely, the theory thus cast into a new form,—derives its name from the supposition on which it is based,—that all bodies are ultimately composed of atoms. I should like you, however, to bear in mind that the “forces” of the previous century were still retained. These were supposed to be, at times, actually energizing; again, they were latent; and thus was added to all the other mysteries of nature, a new one in the shape of “latent force.” The fundamental questions of physics remained unsolved:—How could “force,” being an accident, exist outside its subject? If this cannot be, what is the nature of attraction? And now we find a further riddle:—How can “force” be in existence, and not be actually making itself felt?

Time passed on, and what is called the New Chemistry was developed. Among many important changes, and perhaps the basis of them all, was this, that “force” became “energy;” the meaning of which is, that the spiritual atmospheres of the earlier physicists were given up once more for the motions of Descartes. It will be remembered, that in the Physics of Aristotle, *action*, *motion*, and *energy*, are synonyms for the same thing. The difficulty of the “latent forces,” however, was not got rid of by this new change. True, they are now called by a different name; they are *energies of position*” instead of “latent forces;” but what they are in themselves remains as great a mystery as ever.

When you take a stone in your hand, and let it rest there, it presses on your palm. Why does it press?

By its energy of position. But what is energy of position? Gravity. And what is gravity? Gravity is a mutual attraction between the earth and the stone. Is it an *attraction* or a *push*? And if it be an attraction, how do the agents contrive to attract one another?

In the same manner, if you place some carbon in proximity to oxygen, and supply a certain amount of heat, they will rush into one another's arms, unless restrained by superior attractions. What makes them do so? Their chemical affinity. And what is chemical affinity? A form of energy of position. What, then, is energy of position? Again the same old mystery.

I need not trouble the reader with other illustrations,—adhesion, cohesion, magnetic and electric attractions, and such like. I want to impress on you that the tendency now is, to give up completely the form of energy lately known as “potential” or “energy of position;” and that our ablest physicists have gone round completely to the motion theory of Descartes. This, as applied to gases, is known as the kinetic theory of gases; it was at first applied to matter in the gaseous state only, but it is being steadily extended to matter in every form.

The advocates of this theory contend, in brief, that there are only two elementary realities in the world,—matter (or *mass*, as it is called), and motion; that mass is in itself utterly inactive, having no “forces” or principles of activity whatsoever; and that its particles being perfectly hard, when once put into motion, will communicate this motion to one another in ever varying forms. This all takes place in a medium of some kind, such as the ether; and it is to waves of this medium, acting by way of *impulsion*, that modern scientists look for the ultimate source of all attractions whatsoever.

Let it be understood that I do not feel called upon to defend this or any other form of the kinetic theory. I believe, indeed, that it is in some manner such as has been just outlined, that all forms of non-vital activity take place in material things. There are difficulties in the way of any complete arrangement hitherto proposed ; but men of science are not thereby deterred from hoping some day to throw further light on the precise manner in which the various motions are communicated.

I will only add that the kinetic portion of the theory is independent of the atomic, and even of the molecular. The latter portions are, in my opinion, quite opposed to the principles of the Peripatetic Philosophy. I have, however, endeavoured to show that both Aristotle and St. Thomas were advocates of the kinetic portion of the theory : and that, in particular, the theology of the latter is unintelligible and contradictory, unless explained in the sense that all actions are forms of motion.

V.

It would be very much to my liking, if I could now have done with this portion of the subject ; especially as much of what I have been saying, and much more of what I am about to say, must seem to many readers very elementary. It is, indeed, elementary ; so much so, that at one time I thought it was known to everybody. It has, however, been very forcibly proved to me of late, that modern Peripatetics not only do not themselves believe in the transmission of motion, but will not acknowledge it to be the doctrine commonly held and taught by men of science at the present day. As it is very necessary for the defence of my position, that I should be able to show that the moderns are altogether on my side as regards the general question,

I am thus forced to prove what might seem to need no demonstration.

The issue thus raised is, not whether, as a matter of objective fact, motion is or is not transmitted from one body to another ; but whether the tendency of modern physics is or is not altogether in that direction.

1. In proof of my view, let me, in the first place, call the reader's attention to what will not be denied by any one who knows even a little about the works on Physics lately issued from the press,—that the term “force” has been quite discarded, as designating a thing unknown ; and that the word “energy” is almost everywhere used in its stead. The great principle in which so much of modern physics lies crystallized, is denominated the Conservation of Energy, not of “force.” Why was this change introduced ? I have already intimated that it is due to a change of opinion with regard to the origin of motion,—the Aristotelic ἐνέργεια or κίνησις. If you do not think the explanation satisfactory, you have to suggest another which is better or even as good.

Dr. Mivart ought to be a fairly reliable witness on such a matter : let us hear what he says :—

“One of the most striking and fruitful discoveries of modern times, has been the discovery that the physical forces (light, heat, motion, chemical activity, electricity, &c.) have exact relations of quantitative equivalence, instead of being, as previously supposed, independent of any such definite correlation. This discovery led to the conception of the physical forces being actually transformable one into the other, and thus rather different manifestations of one force, than radically different forces. This conception has been vividly expressed by calling ‘heat’ a ‘mode of motion,’ and *the tendency has arisen to consider all other forces as motion in some other form or condition.* Of late physicists have more or less discarded the term ‘force’ in favour of the word

‘energy,’ the latter being used to denote phenomena which can be measured, and the facts of correlation are now differently expressed. It is rather said, for instance, that motive energy is changed into heat energy, and the reverse, than that ‘forces’ are transformed.”¹

Dr. Mivart goes on to tell how the various chemical elements were tabulated, and exact quantitative relations as to weight found to exist between them. He continues :—

“ This led to the conception and general adoption of what is known as the ‘atomic theory,’ according to which the various elementary substances consist of ‘atoms,’ while the more complex substances consist of ‘molecules,’ each molecule consisting of groups of definitely combined atoms. *A further step was taken when the energy of the various physical forces acting in any substance came to be considered as being actually, but different ‘modes of motion’ of the molecules composing such substance.* On ‘vital force’ being discarded in favour of merely physical force, as an explanation of phenomena of life, *all the actions of living beings came also to be explained as forms of motion,* either motions of large parts (as in the movements of limbs), called ‘molar motion’; or motions of minute parts—minute waves or oscillations (as *e. g.* supposed to exist in the action of nervous tissue) called ‘molecular motion.’ ”²

The writer next informs his readers how this mechanical theory of the movements of bodies has been extended by the materialists even to vital actions, such as the growths of vegetables, the sensations of animals, and even human thought :—

“ *A passion for considering nature as a mere mechanism of matter and motion, and all its actions as merely mechanical, is a tendency of our day. It is the scientific ideal of a very large school of thinkers, and is the goal towards which they strive;*

¹ *On Truth*, p. 393. The italics are my own.

² *Ibid.*, p. 394. Italics mine.

and in so striving they only follow the lead of the earliest of modern philosophers, Descartes.”¹

To the last passage a note is appended, as follows :—

“ Kirkchenoff has said :—‘ The highest objects at which the natural sciences are constrained to aim, is the reduction of all the phenomena of nature to mechanics ;’ and Helmholtz has declared :—‘ The aim of the natural sciences is to resolve themselves into mechanics.’ Wundt observes :—‘ The problem of physiology is a reduction of vital phenomena to general physical laws, and ultimately to the fundamental laws of mechanics ;’ while Haeckel tells us that ‘ all natural phenomena without exception, from the motions of the celestial bodies to the growth of plants and the consciousness of men,—are ultimately to be reduced to atomic mechanics.’ Professor Huxley also speaks of ‘ that purely mechanical view toward which modern physiology is striving,’ and has said : ‘ if there be one thing clear about the progress of modern science, it is the tendency to reduce all scientific problems, except those which are purely mathematical, to questions of molecular physics ; that is to say, to the attractions, repulsions, motions, and co-ordinations of the ultimate particles of matter.”²

Now, I need not say that I am in perfect agreement with Dr. Mivart in regarding much of this as rank Materialism, as unphilosophical as it is atheistic. But, abstracting from the extravagant extension to vital phenomena of the mechanical theory, and considering the theory merely as applying to the inorganic universe, Dr. Mivart himself “ does not attempt to deny all truth to it,” but merely tries “ to show that much may be reasonably urged against an entire and unreserved acceptance ” of the doctrine. The question, however, is, not whether it is true or false, but how far it is maintained by modern chemists and physicists, as an explanation of the inorganic world. And if it has taken

¹ P. 395. Italics mine.

² Compare Stallo's *Concepts of Modern Physics*, p. 19.

such a hold on the minds of so many who have devoted themselves to an investigation of the phenomena of life, we may judge how far it prevails regarding the lower phenomena that manifest themselves in the motions of inanimate material things.¹

2. Force being thus discarded in favour of energy, the latter is said to be of two kinds,—*potential* and *kinetic*. Concentrate your attention on this kinetic energy, and ask any of the modern physicists what idea it conveys to his mind. Boys in the Intermediate Schools will tell you that it consists in motion ; if they were to give any other reply at the examinations, they would get no marks. It is the contention of the Dynamists that energy of every kind is not so much motion itself, as the cause of movement. That was the old notion, as has been explained,—the idea that prevailed in the days before chemists and physicists found it necessary to distinguish potential energy from kinetic. *Both* of these cause motion ; the difference between them is, that whatever potential energy may be in itself, that which is kinetic causes motion by communicating it. It is, therefore, the belief of almost all physicists of the present day, that there is one cause of motion which is nothing but motion.

I open a dictionary,—that which has been so ably

¹ Dr. Mivart, for his own part, considers the "forces" of matter to be "unimaginable immaterial existences," which are "the active, directing, dominant principle of the material substance." (*Truth*, p. 415.) This is a little vague. One would like to know whether this immaterial entity is a substance or an accident. If a substance, then it is not the material thing itself which is active ; unless, as the Schoolmen teach, the "force" constitutes with matter a new substance. But, then, of what use will it be more than the matter of the Materialists ? Will it also need an accidental "force ?" If, on the contrary, the immaterial entity be itself an accident, it remains to be explained how it can act, and as it can, why it should need divine co-operation.

and industriously compiled by Dr. Funk and his collaborators is the first to hand,—and I find kinetic energy defined there as “that which belongs to every body in motion.” “The kinetic theory of the constitution of bodies” is, according to the same authority, “that which explains their properties by the motion of their particles.”

I pass to the Encyclopedias, and find in Chambers’s, the latest edition, that we “are led to recognise two leading types of energy,—energy of motion and energy of position : or, as they are usually called, kinetic energy and potential.”

Coming to the hand-books, and taking those which I find in use in this College, Wormell¹ tells us that, “to distinguish energy of motion from a kind of energy to be subsequently described, the former may be called kinetic.” And Ganot² writes of “energy of motion or kinetic energy,” identifying the two.

Someone may say that these authors are not of much weight. Dictionaries, cheap encyclopedias, and hand-books, are very well in their way, but they are out of place within lists where Aristotle and St. Thomas, Descartes, Leibnitz, Newton, Helmholtz, Haeckel, Huxley, and Thompson, are breaking lances.

May I plead in reply, that I do not call these humble witnesses to testify to the intrinsic worth of the opinion I am advocating, nor even to the views that prevail among the leaders of thought. Some of these have already been brought on the table, and have spoken for themselves. But even a dictionary may not be a bad authority as to the sense in which a word is used by the average man of education ; and my object in quoting these humble authors, is, to prove that the idea of force

¹ Mechanics, p. 81.

² Physics, n. 59.

as merely a mode of motion, pervades all the physical science of the day, from the highest even to the humblest circles.

3. Let us pass from kinetic energy to that form which is known as *potential*, and of which examples are found in the powers that reside in fuel, in a head of water, in the attractions of the various chemical elements, and such like. The tendency of the moderns to identify all the forces of matter with motion, is such, that these various substances, which seem at first sight so stationary, are thought to derive their energies altogether from more or less minute vibrations of the parts in which they are extended. You lift a stone and allow it to rest on your hand ; it presses you because it is pressed against you. You take a magnet and apply it to iron filings, which will fly to the magnet, because they are borne in a current of something. A head of water falls on a mill-wheel and bears it along, because the water, like the stone on your hand, is carried towards the earth in some finer stream. Water is thus only apparently at rest when its flow is impeded by the closing of a sluice ; it is not really at rest, but is constantly transmitting its motions to the surroundings that hold it in position. I admit that this explanation of potential energy has not yet become common in the schools ; however, as the tendency of the leaders is in that direction, we may expect the subalterns and the rank and file soon to be so convinced of the theory, that they will not even condescend to discuss any other opinion.

In proof of the statement that the most eminent physicists do not now recognise any difference in nature between potential and kinetic energy, I might refer once more to the extracts already quoted from Dr. Mivart.¹

¹ See *antea*, p. 141.

“The aim of the natural sciences,” says Helmholtz, “is to resolve themselves into mechanics;” mechanics being, in the language of this school, the explanation of natural phenomena by the transfer of various motions. Lord Kelvin writes of the kinetic theory of gases, now almost universally accepted by physicists, that it “explains seemingly static properties of matter by motion ; so that it is scarcely possible to help anticipating in idea the arrival at a complete theory of matter, in which all its properties will be seen to be merely attributes of motion.”¹

In Ganot’s *Physics*² I find the following, which may be not without a special interest, as that work is used as a text-book in this College :—

“In our attempts to ascend from a phenomenon to its cause, we assume the existence of physical agents, or natural forces, acting upon matter ; as examples of which we have gravitation, heat, light, magnetism, and electricity. Since these physical agents are disclosed to us only by their effects, their intimate nature is completely unknown. In the present state of science, *we cannot say whether they are properties inherent in matter, or whether they result from movements impressed on the mass of subtle and imponderable forms of matter* diffused through the universe. *The latter hypothesis is however generally admitted.* . . It is also considered that the intimate particles of which matter is made up are capable of definite motions varying in character and velocity, and *which may be communicated to the ether.* A motion of a particular kind communicated to the ether can give rise to the phenomena of heat ; a motion of the same kind, but of greater velocity, produces light ; and it may be that a motion different in form or in character is the cause of electricity. Not merely *do the atoms of bodies communicate motions to the ether, but this latter can impart it to the former.* Thus the atoms of the bodies are at once the sources and the recipients of the

¹ *Popular Lectures*, p. 225.

² P. 3, n. 6. The italics are mine.

motion. *All physical phenomena*, referred thus to a single cause, *are but transformations of motion.*"

In his well-known work on *The Concepts of Modern Physics*,¹ Mr. Stallo has collected quite a pile of evidence on this point, taken impartially from almost all the greatest names in science. He begins with an extract from *The Unseen Universe*, by Professors Balfour Stewart and P. G. Tait :—

"If Le Sage's theory, or anything of a similar nature, be at all a representation of the mechanism of gravitation, a fatal blow is dealt to the notion of the tranquil form of power we have called potential energy. Not that there will cease to be a profound difference in kind between it and ordinary kinetic energy, *but that both will be henceforth to be regarded as kinetic.*"²

In his explanation of the fundamental principles of the mechanical theory of the universe, Mr. Stallo states the fourth and last principle thus :—

"*All potential energy, so called, is in reality kinetic.* Mass and motion being fundamentally disparate and inconvertible, and mass being absolutely inert, whatever be its position, motion cannot originate in or be caused by anything but motion. Energy due to mere position, therefore, is impossible."³

Further on he writes :—

"According to the mechanical theory, motion, like mass, is indestructible and unchangeable ; it cannot vanish and reappear. Any change in its rate results from its distribution among a greater or less number of units of mass. And,

¹ Of Mr. Stallo's work Dr. Mivart writes :—"The criticisms of this work have been warmly praised by some of the first physical experts, though its author makes no claim to be considered an expert in Physics." *On Truth*, p. 397, note.

² *Concepts of Physics*, p. 66. Italics Stallo's.

³ Chap. 2, p. 29. Italics in the original.

motion and mass being mutually inconvertible, *nothing but motion can be the cause of motion. There is, therefore, no potential energy; all energy is in reality kinetic.*"¹

When doubts were expressed as to whether the foregoing represents correctly what the supporters of the mechanical theory really hold, Mr. Stallo defended his previous statements, as follows, in an introduction specially written for the second edition of his work :—²

"One of the most noted physicists and chemists in the United States is Professor G. F. Barker, of the University of Pennsylvania, who, in the address delivered by him as retiring President of the American Association for the Advancement of Science, in 1880, said :—

'As defined hitherto, energy is either motion or position; is kinetic or potential. Energy of position derives its value obviously from the fact that, in virtue of attraction, it may become energy of motion. But attraction implies action at a distance; and action at a distance implies that matter may act where it is not. This, of course, is impossible; and hence action at a distance, and with it *attraction and potential energy, are disappearing from the language of science.*'³ Now, as Preston has suggested, if we regard the aether as a gas, defined by the kinetic theory that its molecules move in straight lines, but with an enormous length of free path, it is obvious that this aether may be clearly conceived of as the source of all ordinary matter. It is an enormous storehouse of energy, which is continually passing to and from ordinary matter, precisely as we know it to do in the case of radiant transmission. *Before so simple a conception as this, both potential energy and action at a distance are easily given up. All energy is kinetic energy, the energy of motion.*'⁴

"And in England we have Herbert Spencer, who, though not a professional physicist, is regarded by a great number of eminent men of science as the highest authority on matters

¹ Chap. 6, p. 66. Italics mine.

² P. xxix.

³ Italics mine

⁴ Italicized by Mr. Stallo.

like that now under discussion. While he is generally at war with Professor Tait, he is in full agreement with him here. In the 'Appendix' to the fourth edition of his 'First Principles,' Mr. Spencer replying to certain criticisms of Professor Birks, says :—

'Now, the tacit implication here is, that I accept the doctrine of potential energy. . . In the first place, I have to ask on what authority Professor Birks assumes that I hold the doctrine of potential energy in the way in which it is held by those named? In the chapter on the Continuity of Motion, I have, at considerable length, given reasons for regarding the conception of potential energy as an illegitimate one; and have distinctly stated that I am at issue with scientific friends on the matter. Let me add that my rejection of this doctrine is not without other warrant than my own. Since the issue of the last edition of this work, . . . Mr. James Croll, no mean authority as a mathematician and a physicist, has published, in the *Philosophical Magazine* for October, 1876, page 241, a paper in which he shows, I think conclusively, that the commonly accepted view of potential energy can not be sustained, but that energy invariably remains actual.'"¹

I might cover a good many pages with extracts from this remarkable book of Stallo's. It is right to state that the author is by no means in favour of the mechanical theory, which he proves to be so widely prevalent among men of science. I will wind up these quotations with one other from Stallo himself :—

"*With few exceptions, scientific men of the present day hold the proposition, that all physical action is mechanical, to be axiomatic, if not in the sense of being self-evident, at least in the sense of being an induction from all past scientific experience.*"²

¹ Pp. 583, 584.

² In connection with Mr. Spencer's views with regard to the continuity of motion, see Chap. xvii., p. 392.

³ Chap. I., p. 23. Italics mine.

VI.

Let me here remind the reader of the precise point I have been endeavouring to prove. Some of our Catholic theologians and philosophers do not believe that the doctrine of efficient causality, by means of the reception and transmission of motion, is a belief widely prevalent among modern physicists. Moreover, they think it so much opposed to the teaching of the Church, that one could not subscribe to this kinetic theory without ceasing to be an obedient Catholic, especially if one should go so far as to think it applicable to such actions as are vital and free. This may seem strange, in face of the evidence submitted in the previous chapters; it is, however, only too true.

The witnesses produced in this chapter are not relied on to prove the truth of the kinetic theory generally. It would not follow that efficient causality consists in the reception and transmission of motion, even though such were the teaching of all the scientists since the days of Descartes. In fact, the very same body of testimony might be adduced in proof of the atomic theory itself,—a theory in which I have no faith whatever. This is by the way,—to illustrate how it is that modern physicists have not been summoned as witnesses, in any hope that their evidence would, once for all, settle the general question.

But if, as has been contended, it is disobedience to the Church to hold and teach that a substance or faculty may be a true efficient cause, while merely receiving motion, retaining it for a time, and then transmitting it to another subject,—if this be uncatholic, how many men of science shall we be able to retain within the fold of Christ? Is the whole atomic theory, then, condemned? For, be it remembered, the atomic theory

goes much further than this point of the transmission of motion.

It may be urged, in reply, that one might be allowed to retain this notion of efficient causality with regard to transient actions, especially where there is question merely of the activity of mere inorganic matter, whereas it would be a much more serious thing to apply the same doctrine to vital and free acts, especially those of the supernatural order.

But, surely, the only shadow of a reason for refusing to allow the theory to be applied to such actions is, that a faculty which is capable merely of receiving and retaining a divine motion, cannot be *active* in any true sense of the word, but is purely passive in the hands of God,—a doctrine long ago condemned in Luther and Calvin. If there is any other ground of suspicion regarding the kinetic theory, I have not heard of it.

And what becomes of the basis of this accusation in face of the indemnity universally allowed to the mechanical theory of the activity of inanimate matter? If a lump of coal or a locomotive may be an efficient cause in the truest sense of the word, though neither does more than merely receive motions, retain them for a time, and then transmit them to other substances, acting always under the influence of divine conservation; how can the mere reception and retention of motion be pronounced insufficient to insure true effective causality? It is sufficient in the locomotive; why not in the human soul? Let there be one measure meted out to all; whoever will designate as uncatholic the kinetic theory as applied to vital actions, let him be consistent, and maintain that in the Catholic Church there is no room for those who believe in the mechanical theory of the activity of inorganic matter. There should be even less: for, as has been already said, one may

advocate the kinetic theory, and yet not believe in the least in the doctrine of atoms, but stand by the old substantial forms of the Schoolmen.

If, on the other hand, my contention be correct, that, in so far as they have rejected the doctrine of "force" as distinct from motion, Descartes and the moderns have but gone back to the teaching of Aristotle and St. Thomas,—the teaching traditionally preserved in the Thomistic school, till it became debased through external influences in a series of weak generations;—what an answer we have to the accusations so long and so freely made against the Church, that her policy is reactionary, and her doctrines opposed to the progress of science. Who are the reactionaries? Who have had to go back? Not we, who teach to-day the very principles which St. Thomas imbibed from the pages of Aristotle. Our fathers in the Catholic schools knew of "modes of motion" many centuries before Tyndal or Thomson were heard of; and they never deserted the Catholic tradition, whether for the "*force-monads*" of Leibnitz, or the *philogiston* and *imponderables* of Cavendish, Priestly, and the Materialists of the eighteenth century. Would that we could say the same with regard to the "potential energies" of the physicists of recent times!

CHAPTER VIII.

AGENTS, OCCASIONS, AND CONDITIONS.

So far I have been dealing with the extrinsic evidence for and against the kinetic theory, with occasional references to the principles by which philosophers and theologians were influenced in forming the opinions which have been explained. The evidence submitted may not have convinced the reader that the teaching of the great authorities referred to is in reality as it is represented here. I hope, however, it will be acknowledged that a good deal has been said which calls for explanation,—that a *prima facie* case, at least, has been made out.

I purpose now to examine the intrinsic evidence,—principally that portion of it which is regarded as telling against my own view. For, the primary object of this Essay is, not so much to prove the truth of the kinetic theory, as to show that the theory is not in any way opposed to Catholic teaching. This portion of my Essay, accordingly, will be mainly of a negative character, rebutting the evidence submitted by the other side. I hope to introduce positive explanations and arguments here and there, as opportunity may occur; and I shall have to refer occasionally to the opinions of the great Catholic Masters, promising the reader to limit the number and extent of these references, as far as may be compatible with the gravity of the issues that arise.

The objection urged most strongly and persistently against the kinetic theory, as I have advocated it, is, that if creatures were able merely to receive, sustain, and sometimes transmit, motions infused into them by God, they would not be active or efficient causes in any true

sense ; but merely *occasions* or *conditions* of the exercise of the divine activity. Already something has been incidentally observed in reply to this objection. As, however, the matter is fundamental in relation to the general question, it will not, I hope, be deemed out of place to discuss here formally what is the essential difference between efficient causes, occasions, and conditions. It is only when one is able to discriminate accurately between these things taken generally, that one is in a position to decide to which class *motion* properly belongs.

I.

There are, as everybody knows, four different kinds of causes,—*efficient*, *material*, *formal*, and *final*. Now, it is pleasant to find in Zigliara a definition of *efficient causality* which should be satisfactory to all, at least to every Catholic. Zigliara takes his definition from Suarez, and quotes Goudin also in its favour ; so we may all be very well content with what is stamped with the approbation of the representatives of the two great Catholic schools. The definition is this :—“ An efficient cause is an extrinsic principle from which motion first flows ; or [it is] the production of something by means of action.”¹

In this definition, as the reader will have observed, there are two parts divided by the conjunction “or.” The second of these parts is parallel with the whole of the first, and is not an explanation merely of the phrase “motion flows.” Hence, in the one sentence we have two definitions, one an explanation of the other. Should anyone doubt of this, he will have his doubts set at rest

¹ “Causa efficiens recte dici potest : Principium extrinsecum a quo primum fluit motus, seu rei productio mediante actione.” *Summa Phil. Ont.* 44, II.

by reading the passage in which Suarez¹ explains and expands the definition, as it was first given by Aristotle.

Taking the first portion of the sentence,—“an extrinsic principle from which motion first flows,”—Zigliara very properly observes that the phrase, “extrinsic principle,” at once distinguishes efficient causes from such as are either material or formal. Both of the latter are intrinsic to the effect. Take, for instance, the Moses of Michael Angelo: its material cause is the marble; the formal cause is the figure which the block received from the artist; both marble and figure are intrinsic portions of the statue, which is composed of both. The final and efficient causes, on the contrary, are extrinsic,—outside the effect produced.

These two are distinguished from each other by the second portion of the definition,—an extrinsic principle “from which motion flows.” Both final and efficient causes are outside the effect, as has been said; but only from one of them does the effect proceed or flow, as it were. The final cause,—the end Michael Angelo had in view,—*moved* him, indeed, to carve the statue; this motion, however, was only *metaphorical*, as Zigliara well observes. Nothing flowed from the end he aimed at, into the statue; whereas from the artist himself, while he was at work on the marble, there was something constantly passing into the block. In that *flow of something*, whatever it be, the very essence of efficient causality consists.

Allow me to make an observation here, partly by way of parenthesis. The question under discussion all through this Essay is, what precisely is the nature of this “flow” from efficient causes into their effects. What is it that flows from the cause? According to the

¹ *Metaph.*, Disp. 17, Sec. 1.

kinetic theory, it is nothing more nor less than motion ; and lo ! we find Zigliara quoting Suarez, who professes but to expand the words of Aristotle, to the effect that the flow is of motion and of nothing else,—“an extrinsic principle from which *motion* flows.” Not a word of any flow of “force,” as a cause of motion.

Let that pass, however. I do not find it necessary to delay over the second form of the definition,—“the production of something by means of action” ;—unless to remark that, strictly speaking, these words apply rather to *causality* than to *cause*. The cause is the principle in which the production originates ; the production itself is the causality of the cause.

Moreover, as regards the *effect* produced, this is not so much the *action* of the agent, as something in which the action is *terminated*, as we say. This is true in every case. Thus, the effect produced by Michael Angelo was not his own action or actions ; rather each stroke of the hammer produced a change in the figure of the block,—a *new figure*, therefore. It is the same in actions which are purely spiritual, such as intelligence ; the effect proper is not the formative *action*, but the *idea* which it forms. And though there is a dispute in the schools as to whether this applies to acts of the will, I could never see any reason for doubting the formation of a term by a motion of love. Otherwise it would be very difficult to understand, even in the dark manner in which it is given us to perceive such things, how the Holy Ghost could be the substantial term of the substantial action of the divine will.

That the productive action is not the effect produced by a cause, is manifest also from this, that every effect is produced by an action ; which, being a means of production, must precede its effect. Accordingly, if the productive action were the effect produced, there should

be before every action another action, and so on in an infinite series. Efficient causes, therefore, do not *produce* their actions; rather *by means of the actions* which as *material* causes they *sustain*, they produce effects. Hence the definition has it: "an efficient cause is the production of something *by means of action*;" action being the means of production, not the thing produced.¹

There is, nevertheless, a certain sense in which actions may be regarded as effects,—not of themselves, but of antecedent actions. If the first instant of an action be distinguished from the second and all succeeding instants, it would be true to say that the agent is the efficient cause of its action in the *second* and *subsequent instants*, but not in the first. For, the action in the second instant may be caused by the action of the first; but there is no action before the first instant whereby the action of that instant may be produced.

The truth, however, seems to be, that at any one instant, an action is not so much an *action* as a *form*, which becomes an action by its flow from instant to instant.² Hence, to be the efficient cause of an action, say in the tenth instant, really means to be the efficient cause of the form which terminates the motion at that instant; and it is more correct to say that actions are efficient causes, not so much of their own selves, as of their terms.

This is not a matter of much importance, as far as the subject of this Essay is concerned. It is, however, of great importance in connection with actual grace, in

¹ See Suarez, Metaph., D. 18, Sec. 10, n. 8:—"respondetur, actionem proprie ac formaliter non esse ipsum effectum productum ab agente. . . . Ipsa actio non manat media alia actione, alias procedetur in infinitum, sed actio est ipsamet emanatio; sicut terminus motus fit per motum; ipse autem motus non fit per alium motum, quia est ipsamet via ad terminum." Conf., D. 17, Sec. 1, nn. 5, 6.

² See Chap. XII., ii. 3.

dealing with which any mistake regarding the nature of efficient causality, must lead to confusion of a very serious kind. Thus, you will find writers on the supernatural who state on one page that actual grace is not so much a principle of action as an action ; and who a few pages after will not hesitate to say that salutary actions,—even the *motus primo-primi* at their very inception, the first instants of *gratie excitantes*,—are the effects of grace.

II.

All the reader is asked to bear in mind, for the present, regarding the nature of efficient causes, is, that they are principles from which something flows,—something which is described as *motion*. I think all are agreed on this. Let us turn now to *occasions*; let us inquire into their nature, and thus learn how they differ from efficient causes.

Of all the terms current among the children of men, the word “occasion” is probably the most shamefully ill-used,—by philosophers and theologians even more than by the average man. Indeed the term is rarely uttered by the lips of the unlearned ; it smacks of the subtlety of the Schools in which it got its being ; and it may blame the successors of the Schoolmen for much of the abuse to which it has had to submit. They have made it a cause and not a cause ; they have given it influence more or less on an effect ; which, nevertheless, it is said in the next breath only *to permit* or *not to prevent*. When it has suited them, they have made it either incite to sin, or merely play the part of a poor abused innocent.

Writers on Ethics and Moral Theology use the term most frequently ; they might, therefore, be supposed to

be best acquainted with its precise signification. Yet, if you observe the usage prevalent among them, you will find it to be very varied, not only among different authors, but in different portions of the same work ;—nay, in different paragraphs of the same chapter, and even in different sentences of the same paragraph. Take, as an illustration, Fr. Lehmkuhl's *Moral Theology*, and endeavour to ascertain from such a recognised authority what precisely the word "occasion" means.

1. Towards the end of his Treatise on Penance, in the chapter *De Occasionariis*, he gives a formal definition of an occasion of sin. It is, "in general, some circumstance lying extrinsic to a man, which entices and attracts him to sin."¹ "*Entices and attracts*," mind you: if occasions were represented by the Occasionalists as exercising an influence of that kind, it would be over-exacting to find fault with them for rejecting causality. So strong may this "enticement and attraction" of occasions be, in the opinion of Father Lehmkuhl, that he does not hesitate to say that it sometimes amounts to "a vehement temptation." Vehemence is associated with motion,—something flowing from one object into another,—efficient causality, in a word; so that occasions may be active, and that with a rush.

2. Turn back now to the first volume of the same excellent handbook, and look carefully into what the author says in his treatment of Scandal and Co-operation. Scandal is defined, from St. Thomas, as "an action lacking righteousness, which gives to a neighbour an occasion of spiritual ruin."² Here we find once more the term "occasion," in which we are interested.

¹ "Occasio peccandi in genere est quaedam circumstantia homini extrinsecus adjacens, quae eum allicit et pertrahat ad peccatum." (Vol. ii. n. 485.)

² "Opus minus rectum praebens proximo occasionem ruinae spiritualis."

Scandal, we are next informed, is of two kinds, *direct* and *indirect*,—each, of course, partaking of the general character that has been defined, and therefore “giving to a neighbour an occasion of spiritual ruin.” I beg you to mark attentively the kind of scandal that is designated *indirect*. Does it “entice or attract” to sin? Does it, for this purpose, bear down with “vehemence” on its object? Not at all; it may be quite passive; the neighbour’s sin may be only “*permitted*” or “*not prevented*,” or the scandal consists merely in this, that “one does not *omit* one’s own action on account of a neighbour’s sin which one foresees.”¹

And so we are taken on through scandal and co-operation, being assured that they are either active or merely permissive, as the convenience of the writer may require for the time. Think of the contradiction involved in the notion of a *co-operation* that is merely *permissive*. If a Thomist were to say that the human will *co-operates* with the divine premotion while merely holding itself *permissive*, one may imagine what a cry of Calvinism would be raised. Can it be, then, that what is co-operation, even “vehement influence,” in Moral Theology, may not be such at all when one is dealing with the relations of God to man?

3. Of course, it will be urged, in reply, that when a scandal-giver is said to be the *cause* of his neighbour’s sin, he either directly *intends* the offence committed by the sinner, or at least, *without sufficient cause*, puts some enticement in his neighbour’s way. On the contrary, he has always sufficient cause for acting whenever he is allowed “to permit” an abuse of free-will on the part of his neighbour; and he must never himself directly intend the evil effect.

¹ “Peccatum alienum permittitur”; “non praecavetur”; . . . “propter praevisum peccatum alienum actio propria non omittitur.” (Lehmkuhl, Vol. i., n. 628.)

Those who argue thus seem to me to forget that morality—goodness or badness—is not altogether a matter of intention. It is not merely subjective, but is objective in every case. Every external action a man performs has its own morality, no matter what the agent intends. Murder is murder and evil, even though committed for the love of country or for the glory of God ; and the best of intentions will not make injustice just, nor exempt one from the obligation of restoring the property of another. Good intentions affect the *responsibility*, so to speak, of an individual ; he will not be held accountable for his evil deeds, except in so far as he intended them. But objectively,—and it is with objective morality that almost all moral science is concerned,—the goodness or badness of an external action, is not in the least affected by the intention of the agent, but only by what he actually does.

As for the presence or absence of a sufficient reason for acting, how can either affect in the smallest way the question of causing or of permitting the evil result ? If there be no reason for acting, it is admitted that the evil is rightly said to be caused ; but is it not equally caused, even though the agent have the best reason in the world ? The reason he has may *justify* him in causing it, but it will not reduce his causation to a mere permission. Thus, for example, to save myself from a wild beast or an assassin, if there be no other avenue of escape, I may without sin run or ride over a child, even though by doing so, I cause death ; but the danger I am in does not make my trampling one whit less the true cause of the death of the infant. It justifies my action ; but I act, and am the efficient cause of the death of the child, all the same. It is not as if I did not interfere to prevent another from killing it ; it is killed effectively, and the effect is produced by me and by no one else.

The same applies exactly to occasions of sin. He who leaves money exposed, may be justified in doing so ; but whether he is justified or not, his action is equally effective in enticing his servant to steal, if the servant does steal the money. It is not, again, as if the owner of the money did not interfere to prevent some one from stealing what had been exposed by another ; it was he himself and no one else who exposed the money ; and it is the money so exposed by him that induces the thief to steal. The inducement is just the same whether the owner of the money had or had not sufficient reason for doing what he did. Yet, I have found theologians to justify such actions, on the plea that in the first of these cases, the person who flies from danger merely *permits* the death of the child ; and in the second case he who exposes money, merely *permits* or *does not prevent* the theft ;—provided, in each case, there be sufficient reason to justify the action.

Some elegant extracts might be made from standard treatises on Moral Theology, to serve as illustrations of this philosophical principle,—that not only the subjective responsibility of an agent, but the effect of an external action, depends, not so much on what is done externally, as on what the agent intends.

1. Take the following from Lessius, quoted and approved by Lehmkuhl¹ ; it is about the morality of certain acts of ornamentation practised by women :—

“It is to be noted, however, that ornamentation must not be considered scandalous by reason of this alone, that on occasion of it many may be thought likely *to be provoked to evil desires*. . . . Otherwise even natural beauty would be

¹ Vol. I., n. 637.

scandalous, for it is *a much more effective provocative* than that which comes from art ; since art is surpassed by nature.

“ Therefore, although a woman may think that some may fall into crime, she is not on that account bound to lay aside such ornamentation ; just as one who is hated by many is not bound to keep indoors, lest he should give to his enemies an occasion of hatred. The reason is, because the ornamentation of the woman *provokes to sin but remotely* ; therefore she is not bound to lay it aside, lest others should sin ; else she should abstain from it for ever, as such an occasion is perpetual and universal :—this, however, would be too much for human beings to bear. It is sufficient, accordingly, that the neighbour’s sin be displeasing to the woman, and that she do not act in contempt of his salvation.

“ And this is confirmed : for their sin comes from their own malice and *not from the condition of the ornamentation*. For, as they commit sin in connection with this woman, so also they would do with regard to others of great beauty ; and we *are not bound to prevent* at such inconvenience what *comes from the malice of others*.

“ It would be different if by any chance one were called on to abstain merely for a short time, by reason of the peculiar frailty of some one. For, then, charity would require us to omit such superfluous ornamentation for a time, lest a neighbour, who is not thought otherwise unlikely [likely ?] to sin, should be induced to fall by one’s actions.”¹

The extract is rather long, but it is very instructive. It states (*a*) that an ornament may be “ *likely to provoke*

¹ “ Notandum tamen, non ex eo censeri ornatum scandalosum, (i.e., peccaminosum), quod multi occasione illius putentur ad prava desideria provocandi, . . . alioquin etiam pulchritudo naturalis scandalosa esset ; nam multo magis provocat quam artificiosa, quum natura longe superet artem. Itaque etiamsi femina putet, aliquos peccaturos, *non tamen idcirco sub peccato mortali tenetur talem ornatum dimittere* ; sicut is qui a multis odio habetur, non tenetur a publico abstinere, ut inimicis non detur occasio odii. Ratio est quia ornatus iste solum remote ad peccatum provocat ; ergo non tenetur ab eo abstinere, ne alii peccent, alioquin deberet perpetuo abstinere, quum illa occasio sit perpetua et universalis—quod nimis grave esset conditioni humane. Sufficit, igitur, ut ei peccatum proximi displiceat

to evil desires ;" (b) that, however, nature herself "is a *much more effective provocative* ;" yet, a woman may not be bound to lay aside ornaments which "*provoke* but remotely." One reason is, because, in the first place, such an obligation would be too severe, and in the case of natural beauty impossible. This is all very well : but there is a second reason. (c) The neighbour's sin, *provoked* as it is more or less remotely by the woman's actions, *comes from the sinner's own malice* and *not from the condition of the ornamentation*. Hence the "woman is not bound [not to provoke ? not at all ; but] *to prevent what comes from the malice of others.*"

I could not desire a better illustration of the confusion that has crept into Moral Theology in connection with what are described as *occasions*. Here it is admitted that the ornamentation of the woman *provokes* to sin ; yet she is represented as not being bound to *prevent*. As if it were *another* woman who by her ornaments was doing all the mischief. The natural beauty of a woman may *provoke* "*much more efficaciously*" than any additional touch of art : yet it is not from her that sin comes, though she provokes to it, but from those whom she *permits* (!) to go to ruin.

Similar passages might be quoted from almost every portion of Moral Theology. In justice to Fr. Lehmkuhl it must be said, that it is not he alone who is responsible

et ut ejus salutem non contemnat. Et confirmatur : quia quod illi peccent, provenit ex eorum malitia, non ex conditione ornatus ; sicut enim circa hanc mulierem peccant, ita etiam circa alias eximiae pulchritudinis ; atqui id, quod ex aliorum malitia provenit, non tenemur cum tanto gravamine nostro impedire. Secus, si aliquo casu ad breve solum tempus ob peculiare periculum alicujus abstinendum esset : . . tunc enim caritas postularet ut *pro tempore* talem ornatum omittam superfluum, ne proximus, qui alioquin non putatur non peccaturus, inde peccandi occasionem habeat." (Lehmk., Vol. I., n. 637.)—Curiously enough the author italicizes the passage in which it is asserted that the woman *is not bound to lay aside* the ornamentation,—to give prominence to the reason on which he relies.

for this confusion ; every moralist I know of is equally to blame. They may know what they mean ; I hope they do ; but my belief is, that much controversy would be avoided regarding the morality of certain actions, if, in the treatise *De Actibus Humanis*, moralists would attend to the precise meaning of the philosophical terms they use.

2. As a further illustration I will quote the following from Lehmkuhl, hoping the reader will pardon me, when I assure him that it will be the last extract he will be asked to read in connection with this portion of the subject :—

“ To understand aright why and how it may be lawful to act, even though one should foresee that another will sin in consequence, call to mind what has been laid down with regard to those things that are said to be voluntary only indirectly and in cause. For instance, what follows in some way from my action is not always imputable to me, and voluntary in the full sense ; but on account of a good effect I may often *permit* an evil *effect* connected therewith. This is of even greater force in this matter of indirect scandal, for as much as ultimately the neighbour's sin is free and voluntary to the sinner himself ; and the whole question is reduced to this, whether, according to the rules of charity, I am or am not bound *to prevent* such a spiritual evil to a neighbour who wishes it himself.”¹

Mark what is here stated. (a) The neighbour's sin is recognised to be one of two *effects* of the action about the

¹ “ Ut rite intelligatur, cur et quomodo etiam cum praevisione alieni peccati secuturi, nihilominus mihi agere liceat, recolenda sunt ea, quae de voluntario indirecto et in causa tantum dicta sunt ; nimirum non semper ea quae ex actione mea aliquo modo sequuntur, mihi esse imputabilia et pleno sensu voluntaria, sed propter effectum bonum me non raro effectum malum connexum permittere posse. Id eo magis valet in hac re quod tandem alienum peccatum ipsi committenti sit voluntarium et liberum ; atque res tota eo reducitur, utrum secundum regulas caritatis tale spirituale malum alterius ab ipso volitum impedire teneat, annon.” (Lehmk., *Ibid.*, n. 633.)

lawfulness of which the question is raised. (*b*) So true is this, that the principle referred to in the treatise *De Actibus Humanis* is that which deals with *actions* having two or more *effects*. Nevertheless (*c*) when common sense tells those theologians that one of these actions is lawful, they justify the decision by saying that the evil *effect* is not so much *caused* as *permitted*. Now I ask: how can a thing be an *effect* of an action, and yet be merely *permitted* or *not prevented* by the agent? What is the meaning of this sentence in Lehmkuhl:—"On account of a good effect I may *permit* an evil *effect*"? Merely *permit* the *effect* of *my own action*!

I do not complain of the conclusions at which these theologians have arrived; but only of the use they make, in the arguments by which they justify their teaching, of such terms as "occasion" and "permission." Whatever is *effected* by an action is not merely *permitted* by the agent; and any science that bases its arguments on such a confusion of ideas, is but a travesty of science; however the common sense of its professors may save them from error in the conclusions at which they arrive.

Nor can I allow it as an excuse that such is the universal usage;—that these terms have a *supposition*, as we say, which is quite common, and therefore justifiable in Moral Theology. If you take a case in which the moralist gives his decision *against* the lawfulness of an action, you will find that his arguments are based on quite a different use of the very same terms. The bad action is pronounced to be bad, because it does not merely *permit* but *cause* the evil effect. It is said to cause the effect when this is to be pronounced sinful; and though the action *does* quite the *same thing* in other circumstances, when the effect is admitted to be equally an effect; the euphemism in this case is, that the effect

is not caused, but only permitted or not prevented ; and all because common sense dictates that in one case the action is justifiable, and in the other it is not.

It is plain, therefore, that even in Moral Theology, the use of these terms is not consistent or uniform ; and I fail to see that writers on ethical subjects have any right to base their conclusions on arguments the entire force of which is derived from an inconsistent and contradictory use of terms.¹

IV.

If you want to know what an occasion is and what it does, the best way is to take a number of examples of what are universally recognised as occasions, and examine carefully their mode of being and of acting. When prudence dictates to you that a sufficient number of samples have been thus analyzed, you will be in a position to conclude by induction that an occasion is whatever you will find it to be. I do not propose to conduct you through all the analyses you may find necessary ; but will ask to be allowed merely to submit one or two specimens for the purpose of indicating how I came by my own idea of occasion, and also of explaining what my notion is.

1. Take the case already referred to, in which a person leaves money lying about his rooms, with the result that his servant yields to a temptation to steal. Everyone will admit that the money in this case is an occasion of the theft ; so is intoxicating drink an occasion of drunkenness to a toper ; the sense of present danger to

¹ The Council of Trent (sess. 6, de justif. can. 6) and all theologians rightly describe God as permitting sin. He does not, however, merely permit the sinful *action*, but *co-operates* with the sinner, *promoving* him to his act. Sin, let it be noted, is more than an action, by the amount of a certain relation attached to the latter.

a brave man is an occasion of valiant conduct ; to a Sister of Charity the sight of one in pain is an occasion of showing pity and self-sacrifice. Examples might be given without number ; let us examine carefully what happens in the case of theft.

The coin reflects rays of light, so as to make an impression on the eye of the thief. Consequent on this impression is a vital act, indeed a series of vital acts, but above all what are known as *vision* and *desire*. Then follow another series of motions,—of the thief towards the money, to seize on it, pocket it, bear it away. From the moment the colour of the coin was first impressed on the thief's eye, until he has walked off with the money in his pocket, vital actions have been so mixed up with others which are purely mechanical, that it would take a deal of time to describe each action separately, even in part ; nor is it necessary to enter into such an analysis here.

I must, however, ask you to attend very carefully to the nature of these vital actions. In the Scholastic Philosophy an action is vital when it does not come from without, but arises spontaneously within the faculty from which it proceeds, when this has been affected by some form or condition. This spontaneity of origin within the faculty must not be understood so strictly as to exclude premotion on the part of God : it is opposed only to the *transit* of the motion into the faculty from *any other created agent*. Should the reader not be prepared to accept this definition of vitality, he is referred to a later Chapter, where the matter will be formally discussed.¹

Remark, now, the difference between the mode in which the rays of light reflected by the coin are impressed

¹ See Chap. xv.

on the eye of the thief, and the mode in which, having received that impression, he proceeds to see, to desire, and to move his members in space. The impression from without is made on the organ of vision by a *transit* of something from the coin to the eye. Immediately after the reception of this something, there arises in the same organ a vital act of vision; that is, an action in the production of which there is no transit at all. The vital act of vision is followed by one of desire, also arising spontaneously within its faculty, and not received therein either from the external object,—the coin,—or even from the act of vision in the organ of sight.

I would not have you understand, what is physiologically quite untrue, that accompanying these spontaneous vital actions there are not others altogether mechanical, leading to a constant waste in the organs, even when most vitally moved. What Catholic Philosophy insists on is, that between vital and mere mechanical or transient actions, there is an essential difference, consisting in this, that mechanical movements, unless excited by a special divine intervention akin to miracle, are transmitted from one created agent to another; whereas vital motions arise spontaneously, given certain conditions.

2. This difference with regard to the manner in which the two kinds of motion have their origin, has led to a corresponding distinction between two species of efficient causality,—*physical* and *moral*;—a distinction of the very first importance in this matter of causes and occasions.

All through the Catholic system of Philosophy and Theology *things physical* are distinguished from *meta-physical notions*, on the one hand, and from *moral relations*, on the other. Indeed, our whole course of Philosophy

is divided into corresponding portions,—Physics, Metaphysics, and Ethics.

(a) You may take it in this connection, and indeed generally, that whatever is *physical* exists as an individual reality outside the mind. Thus, the *physical essence* of anything is the thing such as it is in itself, independently of any arrangement of its parts such as our minds may make ; and a *physical composition* or *distinction* is one that exists in the objective whole, apart from the manner in which it is intellectual represented by our concept.

(b) On the contrary, *metaphysical entities* exist, as such, merely in the mind ; they are notions,—with an objective foundation, of course. Thus, the universal itself is metaphysical, because, as such, it exists merely as an idea, though it has a basis in the external object, being individualized therein. Hence, the *metaphysical essence* of man is not so much what he is in himself, apart from any thought of ours ; for, as such, he is an individual and his essence physical. It is rather what in man corresponds to and justifies our notion of him, as a being, a substance, an animal, a rational animal ;—for it is by such gradations that we think of things at all. As our knowledge advances and grows definite, it becomes ever less and less generic, till at last it attains a perception of the full, round species ; after which it can attain further perfection only by turning to accidents and becoming equally definite in its apprehension of them. The metaphysical order is thus identical with the subjective, the ideal, the notional, the mental. A metaphysical composition or distinction, for example, exists in the mind and not in the objective whole,—at least not formally ; though, if one's concept be true, it will have a foundation in the object of one's thought.

(c) While the metaphysical order is thus distinguished

from the physical, as the notional from the real ; the *moral* order derives its peculiar character from a *relation* of *duty* or of *right*. It is a reality which is due to something, or to which something is due ; or, more properly, it is this very relation of obligation in itself.

The moral order must not be considered purely subjective any more than the metaphysical ; yet its objectivity consists merely in a relation,—nay, in the one relation of duty. This relation is based, indeed, on certain realities within its subject and its term ; these, however, apart from the relation between them, are of the physical rather than of the moral order.

The objectivity of the physical order is thus absolute, not relative ; at least it is not this special relation of duty or moral obligation. A physical reality, as distinguished from a moral relation, is a substance, or a quality, or a place, or a time, or an action, or even a relation such as equality arising out of other physical realities, but differing from this special relation of moral obligation or right.

The distinction between the two orders is well illustrated by what are called *actual* and *virtual* intentions. Speaking generally, an *intention* is a purpose of the will,—(*in-tendentia*) a motion of the appetite towards its object. As long as the motion actually remains in the faculty, it is said to persevere physically, and to be a real or actual intention : physical, real, actual, in this connection, signify precisely the same thing. When the will ceases to be actually in motion, or receives a motion towards a different object,—forms a purpose altogether different from, but not revocatory of the former,—we recognise that the motion previously existing may persevere morally, as we say, though in the physical order it has ceased to exist. Thus, in contracts, one does not cease to be bound by promises.

the moment they pass out of actual being ; and in sacramental Theology the minister of a sacred rite may act validly, although during the ceremony he may have no intention present physically within his soul.

In all such cases an intention previously formed, and at one time actually existing in the will of the agent, is said to persevere morally after it has physically passed away. The moral perseverance, as is manifest, consists in this, that the previously existing physical intention has become the basis of a relation of duty ; in other words, that some one is bound to act as if the intention previously formed continued in being.

I am well aware that many Catholic writers have endeavoured to explain the efficacy of virtual intentions by supposing them to consist in something physical left by the actual intention, either in the will itself, or in the imagination, or in some faculty of the body which has been applied to external action. This, however, only proves, that, when discussing abstruse questions like that of the causality of the sacraments, writers of great ability may lose sight of the principles which common sense teaches them to apply with unerring judgment to matters of daily life. Virtual intentions are of precisely the same nature, whether they have for their object the performance of a liturgical rite or the transfer of a piece of property. In the latter case no one in his senses would require for the efficacy of contracts, that either the actual intention should itself continue, in however attenuated a form, or that it should have produced an external action or determination of some kind, which should physically persevere. All the property in the world is held by virtue of intentions that have vanished utterly, except for the relations which they produced. The persons who first contracted may have been dead thousands of years ; one would like to know what

physical reality has come from their wills to us ; yet the intentions they had when contracting virtually remain.¹

Even with regard to the administration of the sacraments, it is universally acknowledged that one who contracts marriage by deputy, may be first bound by the marriage contract at a moment when he is physically drunk or asleep. On the contrary, the contract would not be valid, if, at the moment when the deputy goes through the form of contracting, his principal were dead or even permanently insane. What is the reason of the difference? The physical realities produced by the actual intention of the principal, remain the same in both cases. The only intelligible solution is what I suggest,—that a moral relation remains in one case, but not in the other ; or, to put it in a different form, in one case the intention perseveres morally or virtually, in the other it does not.

3. I shall, therefore, take it that the moral order, as distinguished from the physical, signifies a relation of moral duty ; and I will proceed to apply this principle, so as to arrive at a true perception of the difference between physical and moral causes. By a physical cause I understand a principle from which something—the effect—*really* flows. The flux is not any *notion* of the mind ; neither is it a mere *relation* of duty or right ; it is a real, objective effluence of an individual reality from its source. Such is the reflection of rays of light from a coin,—a real passage of wave-motions from the metal to the organ of sight.

In cases of moral causality there is no such objective flow. On the reception of the rays of light from the coin, an act of vision begins in the organ ; this act,

¹ See De Lugo, *De Sac. in Gen.*, D. 8, s. 5 ; Billuart, *De Sac. in Com.* Diss. 6, art. 7, sec. 3.

however, being vital, does not flow into the eye from without, but arises spontaneously within the organ itself. There is no real objective flow here, else the act would not be vital ; yet there is a manifest connection between the mechanical impression received and the consequent vital act. One always follows and must follow the other. The reality whereby the two are thus bound, is not a flow of something, as in the case of reflection of light from a coin to the eye. In what, then, does the connection consist? I believe it to consist in this, that, given the mechanical impression on the organ, the vital action *naturally* follows ; in other words, the vital act is *due*, by *right* of some kind, to the organ on which such a mechanical impression has been produced.

If this be so, moral causes are properly defined as those to which something really distinct from them is natural or due. Thus, substances are not only the material causes of their faculties, in the sense of supporting them ; but also are moral causes, which remain incomplete, abortive, unable to attain their end in the scale of being, till their faculties are supplied. So, human nature, and, above all, the merits of good men, are moral causes of an immortality of happiness, because such is the *right* of every intelligent being who has not committed grievous sin. And so, too, advices, threats, persuasions, prayers, addressed to rational beings, to induce them to any course of action, are moral causes, for this reason, precisely, that on the reception of the physical impression of the threat, prayer, or persuasion, the receiver has a right to a vital movement or tendency towards the object proposed to him.

This view of the nature of moral causation may seem novel ; and some, I have no doubt, will be inclined to think causes moral, precisely in so far as they are

responsible for their actions. He who prays or threatens another, inducing him thereby to do something, gets a moral relation towards the result,—a truth which I do not mean to question in the least. But why is one responsible for advice, threats, and such like? Is it not because an intelligent and free agent is, by reason of his advices or threats, the moral cause of what another does in consequence? It follows, therefore, that the moral cause of an action is not such precisely because he is responsible for the action; but rather, *vice versa*, that one is morally responsible for a thing, precisely because one has caused it morally, at least.

This is so true that in many cases agents which produce effects morally are incapable of responsibility. A hungry dog by his wistful looks induces me to throw him a bone; he is the moral cause of my action, yet is not responsible. His mute petition has not the least morality in that sense; yet its causality is surely not of the physical but of the moral order; for, the effect produced, my action, is vital and even free. Why, the very effulgence of a gold or silver coin, in the case of theft, is the moral cause of the crime committed. Yet the coin is not responsible; and it should equally be the moral cause of its own abstraction, if it tempted not a man but a jackdaw to take it away. In this last case there is no moral responsibility on either side; yet there is true moral causality; for, again I ask, how can anything external to the agent be the physical cause of a vital act?

4. Taking my own definition of moral causality, you have a right to ask what is meant by a thing being *natural* or *due*. The idea conveyed to my mind is this, that when a thing is natural or due in the way I have explained, the subject to which it is due is incomplete

without it,—is unable of itself to attain its proper perfection ;—and that, consequently, some person is responsible for its inutility in the world. Who is responsible? Who but Him who made it, and who cannot allow Himself to make anything without an end, and a capacity to attain the same? Hence, He is bound to complete substances by adding their faculties ; to fit terms to actions ; to pay the reward of merit ; to transmit mechanical motions ; and, where the faculty is vital, to cause actions to arise therein spontaneously, whenever they are called for by the conditions to which the faculty has been reduced. It would be otherwise if vital faculties could move themselves from potentiality without being moved by another. That, however, is impossible, seeing that they are only in potentiality. Someone must supply the motion in the first instant ; and I know of no one who can either do it or be bound to do it, unless He who made the faculty for His own wise ends. If any of my readers can point out anyone else on whom to lay the obligation, I have no objection to laying it on him.

A word with regard to this obligation under which, as we say, God is thus laid. It is not necessary to safeguard Catholics against the error of supposing that He can be bound as an inferior,—as if He were subject to someone greater than Himself. It may be well, however, in the interest of any person not a Catholic who may happen to read these pages, to say that we do not conceive God as thus bound in subjection to another. He is bound to His own nature only. His perfection will not allow Him to lie, or to be false to His plighted word. And as, when He creates anything, He cannot but have a wise end in view ; He thus implicitly gives the guarantee of His own wisdom and holiness, that He will make His creature capable of attaining this end for

which it is made. Thus, God would be false to Himself and to His own infinite perfections, if He were to fail to be as good as His word. It is in this sense that He is bound by His own divine nature to bring things to their natural perfection ; as He is bound by the same infinitely perfect nature not to lie or to fail of His promise. The moral relations which subsist thus between God and His creatures, are truly objective, inasmuch as they have an objective foundation in the creatures ; yet it is not to the creatures that God is bound ultimately, but to His own infinite perfection.

v.

I may seem to have diverged somewhat from my subject,—the nature of occasions. The reader will find, however, that what I have been saying is not irrelevant, inasmuch as occasions and moral causes are very much alike. In fact, every true occasion is a moral cause ; though the reverse by no means follows,—every moral cause may not be denominated an occasion. Thus, the substance of the soul is the moral cause of its faculties ; they are natural and due to it ; we do not, however, speak of it as their occasion. Give food to an animal or water to a plant, and you are the moral cause of the vital acts that follow ; but it would be an incorrect use of the term “occasion,” to say that these acts are occasioned by you.

There are, therefore, two classes of moral causes. Some act, as it were, on agents that are necessary, as in the examples just given ; in other cases the effect need not necessarily follow,—in this sense, at least, that what is due to the cause is an action from which, after a little time, the agent may freely abstain. We see this in every

example of a true occasion, whether of sin, of merit, of gaining glory, or of any human act. Given a certain condition, God necessarily excites a motion in the will of him who is, as we say, placed in or acted on by the occasion; so, however, that the will, being free, may abstain from this motion. Moral causes of the second class and they alone are occasions, as the word "occasion" is commonly used.

Conditions remain to be dealt with. A condition is not an efficient cause either of the physical or of the moral order; since what is merely conditioned neither flows from its antecedent, nor is it in any sense natural thereto. Thus, for example, *possibility* is a condition of *existence*; but, as is easily seen, it does not cause existence by way either of physical influx or of moral pressure. Conditions, accordingly, are realities which themselves do not contribute in the least to an effect, but merely make it possible for other causes to contribute. They may be either absolutely necessary, so that in their absence the real causes cannot operate at all; or the conditions may be of such kind as to render the operation more easy of performance. In the second case the requisite is more strictly denominated a *disposition* rather than a condition; though, indeed, the term "disposition" is often used to designate a true efficient cause, the efficiency of which is *moral* and at the same time only *remote*. Thus, dryness in wood is, in the strict sense, a disposition for combustion; inasmuch as wood is not burned by *means* of, but rather on *condition* of, its dryness; the condition being, in the case, not absolutely necessary. On the other hand, prayers, advices, merits, and such other moral influences, are not unfrequently said to *dispose* a person either for the reception of some form, or the performance of some action; when the meaning is, that the influences in question are true efficient

causes ; contributing morally, but still remotely, to the form or operation towards which they are said to dispose.¹

VI.

Let us return now to the question proposed at the beginning of the Chapter :—According to the kinetic theory,—of activity by reason of the transmission of motion,—would the activity of created agents be reduced to occasionalism or to mere conditionality ? The theory supposes that motion is in every case first infused by God into the created faculty ; that He sustains it there for a time ; that, in case of transient actions, the motion passes from agent to agent, always remaining, in some sense, the same to the end as it was in the first instant of its infusion by God ; that created agents are truly active and not merely occasions or conditions ; that yet their activity consists merely in transmitting from instant to instant within themselves, the motion they at first received, and passing it on to other creatures, when brought into contact with them ; that, as the divine premotion was required at first to communicate motion to the creature, so God must keep on from instant to instant conserving in the faculty the motion which He first infused ; finally, that there is no evidence of the existence within the created faculty of anything intermediate between it and its motion, such as “force” is usually represented to be.

It is argued by Dynamists that this is pure Occasionalism or mere conditionality. What, then, is an occasion ?

¹ In a sense somewhat analagous to this we say in Theology, that the supernatural actions that lead up to the justification of a sinner, are *dispositions* not *merits* ;—the word “merit” connoting a peculiar relation of *dignity* in the person who performs the meritorious work.

And how do occasions and conditions differ from true efficient causes? I have given my answer. The test of efficient physical causality is, whether a physical reality passes from antecedent to consequent. I say that *motion* passes,—a true physical reality; nay the very reality in whose flow or passage physical causality has been said by the Schoolmen to consist. Remember the definition of causality as to which all Catholics are agreed:—"An efficient cause is an extrinsic principle *from which motion first flows.*" You may say that motion does not flow: that is a question in Physics, with regard to which there is not a little controversy. But if it does flow, as it is stated in the definition, and as I contend, is not the principle from which it passes a true efficient physical cause? Do occasions or conditions give out motions to the objects around?

Let me put in another form what I want to impress on the reader. True Occasionalism, such as that of Malbranche, supposes effects not to flow physically from the created faculty; they are produced immediately by God alone, He being bound to interfere thus when the faculty has got certain forms, just as He is bound to excite the vital action of vision whenever a sensible impression has been made by light-waves on the organ of sight. On the contrary, I contend, in the first place with regard to immanent actions, that there is always a new form in the faculty as the result of every such motion; and that this form is produced by a true physical flux from instant to instant within the faculty itself.¹ Occasionalism is, of its very essence, a denial of any true flow of a physical reality; my whole contention, on the contrary, is, that there is such a flow.

¹ See this idea of action or motion as a flow of form, or as St. Thomas puts it, "a form in flux," worked out in Ch. XII., ii., 3, p. 287; also Ch. XIV.

Yet the opinion I advocate is represented as Occasionalism, and, as such, is denounced as having been condemned long since by the Catholic Church.¹

Next, with regard to those mechanical motions that pass from agent to agent,—say, from a cue into a billiard-ball. I hold that there is a true physical flow of motion from the wood into the ivory. An Occasionalist would maintain that God produces motion *de novo* in the ball, at the instant when it is touched by the cue. And there are theologians who contend that these two assertions are quite the same !

I can understand how one may deny that there is a passage of any physical reality from the cue to the ball, in the case proposed ; we will discuss that point presently. I can understand the position of one who would say that, whatever passes, it is not motion but something else, which he might call “force.” But I cannot help being surprised when I hear it urged against the kinetic theory, that it is precisely the same as the teaching of the Occasionalists ; though, according to the kinetic theory, there is a true passage of motion between created agents, which passage, or any other, it is the fundamental principle of the Occasionalists to deny.

With regard to immanent actions, so far is the kinetic theory from Occasionalism, that I, who defend the theory, cannot understand how anyone could be an Occasionalist who knew what an occasion is, and what an action imports. For, in every immanent action, whether of a spiritual faculty, like the human intellect, or of a grosser substance, such as a piece of matter

¹ It is so very absurd to suppose that there is no true flow of form within the faculty, in case of immanent actions, that Occasionalists would probably admit this flow, and continue nevertheless to represent themselves as Occasionalists of the most rigorous type. This, however, only proves that their system is inconsistent, and that its advocates must go back of their fundamental principles, when brought to the test.

hurled by God into pure space, there is a real *flow* of some physical reality,—of form in the first case, and of local position in the other. He who is not prepared to admit this, must have strange notions, indeed. Stranger still must be the ideas of one who admits the flow of reality, but denominates its principle an *occasion*, not a true physical and efficient cause.

CHAPTER IX.

CONTINUITY.

TOWARDS the close of the last Chapter I referred to a matter which enables us to understand somewhat how the advocates of the dynamic theory can perceive no difference between the Kineticism of Descartes and the Occasionalism of Malebranche. One of their difficulties, if not the only or at least the principal one they feel, appears to be, to conceive how it is possible for motion to pass from one substance to another. If motion could not be really transferred, say, from a cue into a billiard-ball ; and if, moreover, there were no "force," as distinct from motion ; it might be argued that the movement of a ball could be explained only on principles of Occasionalism. Indeed, this seems to have been the line of reasoning by which the Occasionalists were influenced ; nor is it very different from the argument which compelled Leibnitz himself to have recourse, at length, to his system of "pre-established harmony." I promised to give this difficulty full consideration ; and propose in the present Chapter to redeem my promise.

I might commence by reminding the reader of what has been observed already,¹—that even though it were proved impossible for an accident, such as motion, to pass from one subject to another, the main portion of my contention would remain quite unimpaired. It is not in the least necessary for the purpose I have primarily in view, to maintain that the motion of a billiard-ball is precisely the same individual reality as had been in the cue by which the ball was moved. I believe, indeed, that it is quite the same ; and that this is the only way in which

¹ See Chap. II., p. 36.

it is possible to explain true physical causality. But what though the motions were different? What I am most anxious to exclude is the notion of "force" as distinct from movement; and how does it appear that there must be such a "force," if motion cannot be transmitted? Of course there must be something in the cue whereby it is able to move the ball; but why could not that something be motion rather than "force"? If it were motion only, there could be no flux in physical efficient causality; but, then, possibly physical efficient causality does not consist in a flux, but in a production. Do Dynamists make it consist in a true flux?

I do not intend, however, to rely merely on this method of defence, but am prepared to stand by the whole kinetic theory;—that mechanical motions are really transferred from subject to subject, without ceasing to be the same after as before their passage. The question has been already¹ examined, somewhat, by the light of authority; I shall proceed now to consider the intrinsic arguments that tell most strongly against my view.

I.

What principally influences those who deny the possibility of this transfer of motion, as far as I can see, is the consideration that an accident, in passing from its subject, must subsist in itself during the time of passage. This, however, at least in the natural order, is quite opposed to the nature of accidents. Therefore, motion, being an accident, is incapable of passing from subject to subject. Sanseverino puts the argument as follows:—

"A substance cannot act on another *by way of communicating* to this some accident belonging to the agent. For, *an accident cannot pass out of the subject by which it is*

¹ See Chap. II., pp. 37-41.

sustained ; neither can it *fly away from its own substance*, so as to reach another ; otherwise *it should subsist in itself*, which is repugnant to the nature of an accident.”¹

Father Pesch writes in the same strain :—

“ It is not possible for a motion, remaining the same in number, to pass from a body which impels another, into that which receives the impulse ; nought remains, therefore, but to be satisfied that there is quite a new motion produced in the body which is impelled. And if it be asked why it is that the motion itself cannot pass from one thing into another, the answer is not far to seek. *No accident can slip across from one subject into another*, as is beyond even the least doubt in case of a modal accident ; but motion is such an accident, inasmuch as it is in its essence the same thing as the object moved.”²

I will spare the reader the fatigue of perusing other passages of this kind, which might be quoted almost without number from the writings of our modern Catholic philosophers. It may not, however, be quite uninteresting to hear what has been said on the subject by such a man as Dr. Mivart ; if we were only to learn thereby whether the men of science have anything to add to the stock of argument current in the Peripatetic schools. In his book *On Truth* Dr. Mivart writes :—

“ It is often said that bodies may, by impact, communicate motion, as when one suspended ball, falling upon others,

¹ “ Substantia non potest quidem in alteram agere, quatenus aliquod accidens proprium cum ipsa communicet ; nam accidens non potest egredi e subjecto in quo est, neque extra subjectum volitare ut aliud subjectum attingat, alioquin in se subsisteret, quod accidentis naturae repugnat.” (*Phil. Christ. Compend.*, Ontol. Cap. 9, n. 171.)

² “ Fieri non potest ut idem numero motus de corpore impellente in corpus impulsus transmigrat ; ergo nihil relinquitur nisi in corpore impulso novum motum ortum esse arbitremur. Quod si quaeratur en cur ipse motus ab una re in alteram transire non possit, responsum in promptu est. Nullum enim accidens ex uno subjecto in aliud transilire potest, id quod de accidentibus modalibus extra omnem vel levissimam dubitationem est ; sed motus, quippe qui entitative idem est atque res mota, accidens est modale.” (*Instit. Phil. Nat.*, n. 61.)

ceases itself to move, while another begins to be in motion, to which latter the "motion" is said to have been transferred. The language used shows a *tendency to regard motion itself as a substantial entity*, which can actually *pass out of one body into another*. Yet, it may be asked, if motion were such an entity, *how could its passage between the two balls be effected?* How is it *to get from one into the other*, and what is to make it go from one into the other? Here we seem to trench upon the confines of human knowledge. We are in a region where evidence is difficult to obtain, and where the effect of the imagination is exceedingly powerful and tyrannous."¹

It will be observed that the lay specialist uses the very same argument as the all-round clerical philosophers. They have all the one difficulty:—how can an accident subsist in its passage between two subjects?

II.

I like to begin a reply to an argument, by returning, if possible, the missiles thrown by the adversaries. The present is a favourable opportunity for this method of defence.

1. I open Father Pesch once more, and turn over just fourteen pages;—one would think no writer could have forgotten within so short a space what he himself had urged. Father Pesch is explaining how agents that seem to act at a distance, are in reality present in some way where the effect is produced:—

"Presence or contact is *of two kinds*: of *supposit* and *merely of virtue*. The first is found where the *supposit* of the agent is immediately present to the *supposit* which is acted on, as a hand is in contact with the pen which it guides. Contact of mere virtue is that whereby an agent is distant from what it acts on, as far as place is concerned, but through

¹ *On Truth*, p. 412; italics mine.

a medium of some kind *transmits its virtue* to the object. It is in this manner that the sun is in contact with the earth by means of its light.

"Accordingly, presence of virtue consists in this, that the agent produces some effect through the whole medium, on even to what is acted on, and this effect may be called the virtue of the cause. When, for instance, the air is heated, it is acted on, as we say, by the fire; and entering into a partnership of action with the fire, transmits the heat."¹

Much more might be quoted to the same effect from this dissertation of Father Pesch's on action at a distance. Lest it should be thought that the doctrine is in any way peculiar to the school to which he belongs, I will venture to submit the following from Zigliara's treatment of the same question:—

"None of the Thomists ever crudely asserted that an efficient cause can act physically where it does not exist. The very contrary is most plainly taught by them all. One thing, however, they maintain,—that after *the emission of an action*, when the effect has been produced in some way, the cause itself can pass out of existence. In this case the effect begun by the action of the cause, ultimately reaches its full development. And since this development takes place by reason of the nature that it got from the first, the Thomists taught in this sense alone, that after efficient causes have passed out of existence, they continue by way of virtue in the effect produced."²

¹ "Praesentia vel contactus duplex est: *suppositi et solius virtutis*. Quorum prior ille est, quo suppositum agentis immediate praesens est supposito patientis; ita manus contingit calamum, quem ducit. Contactus solius virtutis ille est, quo agens loco quidem a passo distat, sed suam usque ad ipsum virtutem per medium transmittit; hoc modo sol terram illustrando contingit. Itaque virtutis praesentia in eo est, ut agens per totum medium usque ad passum aliquem effectum perducatur, qui dici possit virtus causae. Aer. v. g. ab igne, ut aiunt, compatitur, quando calefit, et cum igne actionis societatem iniens, calorem transmittit." Pesch., *Inst. Phil. Nat.*, n. 75.

² "Nemo Thomistarum crude asseruit causam efficientem non existentem physice agere posse, quinimo contrarium omnes appertissime docent; sed hoc unum affirmabant, post emissam actionem effectumque aliquo modo

In this connection it will not be considered irrelevant to remind the reader of what all our philosophers, after St. Thomas, have taught regarding the nature of instrumental causality. An instrumental cause is defined by Zigliara to be "one which acts not by its own force, but by reason of a *virtue communicated to it* by its principal."¹ And going on to explain in what this "communicated virtue" consists, he quotes the famous passage in which the Angelic Doctor teaches expressly that *the communicated virtue is a communicated motion* :—

"There is another way in which an agent produces some effect,—instrumentally; when the effect is not produced by means of the form inherent in the agent, but only *inasmuch as the agent is moved by something* that acts of itself. For, this is the nature of an instrument, in so far as it is an instrument, that *it moves when moved*. Hence, what a complete form is to an agent that acts of itself, that in the instrument *is the motion wherewith it is moved* by its principal."²

It will be remembered that the argument against the transmission of motion is, that motion, being an accident, cannot pass outside its subject. But what about this "virtue" of causes that seem to act at a distance? What about the "virtue communicated" by principal agents to their instruments? Is it an accident or a

productum, causam posse ab existentia cessare; quo in casu effectus inceptus ejus actione ad perfectam explicationem quandoque pervenit; quae explicatio cum habeatur vi naturae primitus acceptae, ponebant hoc exclusivo sensu causas efficientes non existentes perdurare virtute in effectu producendo." *Summa Phil. Ontol.* 46, v.

¹ "Causa instrumentalis ea est quae ut talis non virtute propria agit, sed virtute sibi communicata a principali agente." (*Ibid.* 44, V.)

² "Alio modo aliquid operatur ad effectum aliquem instrumentaliter, quod quidem non operatur ad effectum per formam sibi inhaerentem, sed solum in quantum est motum a per se agente. Haec enim est ratio instrumenti, in quantum est instrumentum, ut moveat motum; unde sicut se habet forma completa ad per se agentem, ita se habet motus quo movetur a principali agente, ad instrumentum." (*De Verit.*, Q. 27, art. 4, in c.)

substance? Possibly it will be said that the virtue of the principal agent is not communicated at all. Answer you who are so ready to assert the impossibility of accidents passing from one body to another. And take heed, I beseech you, not to contradict on this page what you insisted on a few pages back.

2. Again, take transient actions. That there are such, is admitted by every one. They are defined by Sans-everino to be "*those the term of which is borne outside the agent, so that the principle of the action is one thing, and the term another.*" The example given is that of "*heating, which does not remain within the heating agent, but passes from it into what is heated, imparting to this its heat.*"¹

No wonder Leibnitz should have twitted the Schoolmen of his time with their contention, that an action can be truly transient, though never leaving the principle in which it had its source. How can a thing be *transient*, unless it *passes* from subject to subject? St. Thomas frequently states that transient actions are "*those which pass into something outside;*" and he distinguishes them from others "*which do not pass into an exterior object, but rather remain within the agent itself.*"² The cant now is, that no action passes; although the Angelic Doctor expressly makes the passage of some the very characteristic of their nature,—the mark whereby they may be distinguished from others that do not pass at all.

¹ "Actio transiens est ea cujus terminus extra subjectum agens fertur, ita ut aliud sit principium actionis, aliud vero terminus." "Calefactio non manet in calefaciente, sed ab eo emanat in id quod calefit eique calorem impertit." (*Phil. Christ. Compend. Ontol.*, n. 170.)

² "Duplex est actio: una quae transit in exteriorem materiam, ut calefacere et secare; alia quae manet in agente, ut intelligere, sentire et velle." (1, q. 18, art. 3, in c.) This is repeated in ever so many places.

Sanseverino, it must be admitted, is ready with an explanation ; but what an explanation ! “ An action is denominated transient, not in so far as it is an action or an affection of the agent ; for, regarded in this way it remains within the agent ; but by reason of its term or effect, which may be outside the agent, since it is something distinct from the action.”¹

It is, therefore, not the action itself that passes, but rather its effect. Nay, even the effect does not pass, but merely *is outside* the agent ; and it may be outside, since it is not an action but only an effect or term. But, surely, it would occur to anyone to ask : if the term of the action be altogether outside the agent, how does the action ever contrive to reach its term ? And, really, was it not a very awkward slip on the part of the Angelic Doctor,—in a definition, too, and repeated so often,—to say that the *action* passes or does not pass, when he should have said merely that *the term of the motion* is or is not outside the principle from which the motion flows. Nay, there is no flow, whether of a term, or of an action, or of anything else. For, nothing can flow from one substance into another,—nothing, that is, but substance itself ; which, however, we are assured by physics, remains whole and entire in the subject of a transient act.²

3. As for the assertion so often repeated, that an action may produce a new mode of being in an object with which the agent is in physical contact, although it be supposed that nothing passes outside from within the agent, I fail utterly to perceive how such a thing could

¹ “ Actio dicitur transiens, non prout est actio sive affectio agentis, nam hoc modo spectata in agente manet ; sed ratione termini seu effectus, quia cum hic sit aliquid ab actione distinctum, extra subjectum agens esse potest.” (*Ibid.*, n. 171.)

² See Note at the end of this Chapter.

be possible. Pesch, Sanseverino, Zigliara, and the rest, are most careful to insist against the Scotists that an agent cannot act unless in a place wherein it exists. Thus, I find in Pesch :—"Action supposes existence ; but no being exists in distance ; therefore neither can it act at a distance" A little further on he explains :—"Every agent is applied to what it acts on, by means of its active virtue ; . . . but it is impossible for a thing to be applied to what it acts on, unless the agent be in the same place as the object on which it acts."¹

With these statements I have no fault to find : they express my own opinion. But I ask : even though an agent be supposed to touch the object it acts on, does it exist in the very place which the object occupies ? It is not, surely, present there in its substance : therefore it must be by an accident. But, then, this accident must have emanated from—passed outside—the substance of the agent. You can take your choice ; either the two substances occupy the same place, or something in the nature of accidental virtue passes from one into the other ; or an agent can act where it does not exist even in virtue. Take your choice ; but keep to it ; and do not above all things, run from position to position, battering down one moment the defences which shielded you a little before, and to which after a short interval you may have to return for shelter.

III.

Retorts of this kind might be multiplied indefinitely. Let us seek for a direct explanation of the difficulty,—how it is possible for an accident, like motion, to be

¹ "Agere supponit esse ; atqui nullum ens est in distantia ; ergo neque agit in distantiam." (Op. et loc. cit., n. 76.) "Agens per virtutem suam activam passo applicatur ; . . . Repugnat aliquid passo applicari, quod non sit ubi passum est." (*Ibid.*)

supported in its passages from one substance into another.

1. Now I would call attention, in the first place, to the reason commonly assigned for the impossibility of this passage. It is argued that, "if an accident were to fly away from its substance, so as to reach another, it should subsist in itself." So Sanseverino says. Dr. Mivart puts it even more plainly. Those who advocate a transfer of movements "show a tendency to regard motion itself as a substantial entity, which can actually pass out of one body into another. Yet, . . . if motion were such an entity, how could its passage between the two balls be effected? How is it to get from one into the other, and what is to make it go?"

This argument plainly takes it for granted that there is an interval of vacuum between the two substances, from one of which motion is communicated to the other. How else should it be necessary to regard the accident as "a substantial entity," capable of "subsisting in itself"? It is almost incredible that an author should argue in this way, and within the very same page go on to insist on the necessity of physical contact between substances, in order that one should be in a position to act on the other. Sanseverino has managed to compass this feat of inconsistency; and though I cannot find a direct statement in his book *On Truth*, I am convinced Dr. Mivart does not believe in the possibility of action at a distance. If agents must be in contact thus with the objects on which they act, how does it appear that motion should be substantial, if it were able to pass from one substance into another? It should, indeed, be substantial, if it had to pass through a vacuum; but why must it be so, if, owing to the physical contact of its principle and its term, it has a substance to support it all along the line? The sun lights and heats the earth

by transmitting hither a "virtue" of some kind : must that virtue be substantial because it passes from sun to earth?

Dr. Mivart goes on to make the supposition that motion were substantial, and then asks : "how could its passage between the two balls be effected? How is it to get from one into the other, and what is to make it go?"

It would be easy enough to reply that the passage of motion could be effected just as easily as the passage of any other accident,—“force,” effect, or whatever you wish to call it. For, a transfer of something or other there must be ; else, how is the change produced quite outside the agent? Let that pass, however ; as we have done with retorts.

2. If these gentlemen would inquire into what may be the precise reason for what they themselves teach,—that bodies must be in contact before they can act on one another,—the investigation might enlighten us somewhat as to the mode in which accidents are transmitted. They might even find it instructive to begin their researches by determining the manner in which motion is transferred from part to part of some one continuous substance ;—as when water, or wood, or metal, is moved forward in waves, or in any other form.

Still simpler modes of motion might be found, to begin with. For a body may be conceived to move in space, without the least internal change in the relative position of its parts. There is even a more primary concept still,—of something that remains motionless in space, whether as regards the internal arrangement of its parts, or its external relation to surrounding objects ; yet moves on from instant to instant in the line of duration or of time. It seems to me that these things throw a deal of light on the manner in which accidents may be transferred from subject to subject.

(a) Take the last example first, as it is the simplest of all, and is explicitly discussed by the great writers of the Catholic schools. That a substance should be able to move on from instant to instant in the line of duration in time, all that is needed is, the conservation of its existence on the part of Him who created it. The meaning is : God must continue to do in the second instant what He did in the first, and so on through every succeeding instant.

Remark, however, what all our philosophers insist on, that there must be continuous contact, as it were, between instant and instant. If a substance were created in the first instant, allowed to lapse in the second, to be reproduced in the third, then allowed to lapse once more, and so on,—there would be no motion, even in time. True movement,—flow from a principle, source, or beginning,—can be had only by preserving continuity unbroken ; in this instance, by preserving continuous contact, so to speak, between the various points that mark the progress of the being down the line of time.

(b) Bearing this in mind, let us suppose the object to move not only in time but in space. And let the motion be of the simplest form,—a change of the position of the whole, without any internal disturbance of the arrangement of its parts ; as if an absolutely rigid ball were made to move forward in pure space. For this it is not sufficient that the substance of the ball should be continuously created in the same point of space ; it is necessary that in each successive instant, the creative action should have its term one point away from where the term was in the instant immediately preceding. The term must be one point removed in the space line as in the line of time ; so, however, that all the points in both lines be in unbroken contact. 'Accordingly, motion in space—

"latio"—is nothing more than the conservation or continuous creation of an object, so that at each successive instant its position in space is immediately outside, but still in contact with, the position it occupied the instant before.

(c) The next mode of motion to be considered is that which takes place within some continuous substance, such as a body of water, a wooden or metal rod, the string of a violin, or any other such reality.¹ Innumerable examples might be given, from heat, light, electric and magnetic movements. It is not necessary that the motion should have the form of a wave; the movement of a man's arm or leg will do quite as well,—if, indeed, these also are not resultants of very many tiny wave-motions.

As a matter of fact, the motions referred to in the last paragraph are all transient; they pass into the atmosphere, into other objects of sense, into the all-pervading ether, at least. But, though we have no means of insulating matter from contact with ether, so as to prevent all possibility of these various motions passing out of any particular substance; yet, if it be thought desirable, we can conceive a piece of matter moved by heat, light, electric or other waves or motions, in pure space; in which case we are taught by all modern physicists that the substance in question would go on for ever vibrating within itself, without losing one particle of the motion it originally received.

This, however, is not necessary for my purpose. Take the string of a violin, make it vibrate, and ask

¹ This supposes, what is denied by many of the moderns, that such substances are continuous. Catholic philosophers, as a rule, will not quarrel with the supposition; and this is not the place to discuss the matter with the others. These ought, at least, to admit that atoms and molecules *may be* in contact, and that their relative position *may be* changed without actual separation. That is enough for my illustration.

yourself: in what precisely does its motion consist? What makes it move?

We have just seen that if there were an absolutely hard ball, and if it were moved forward in pure space, without any change in the internal relations of its parts; the movement would mean that the ball is being continuously created in distinct, though immediately successive and contiguous points of space, as of time. When a violin string is struck, something of the same kind occurs. It is being continuously created, not in the same point either of space or of time, but in points which are ever changing without any breach of physical contact. The only difference between the two cases—of the ball and of the string—is, that all the parts of the ball are being continuously and equally moved out of their position in space; whereas in the string some points, more or less in number, may remain quite stationary, as far as the space line is concerned; and of the remainder some are moved much farther and more rapidly than others,

So, too, if a man were conceived to be in absolute space, and then merely to move his arm, the rest of his body would continue to be created in the same point of space; the arm only would be produced in a different position. This, or something analogous to it, is what happens in the case of immanent actions; and also in case of those which are transient, during the period before they have left their principle, the agent.

Remark, now, the nature of the flow in each of the cases referred to. In the first, it is a flow merely of position in the line of *time*; in the second, *place* also is changed; in the case of wave or other motions within the parts of a continuous substance, there is, in addition, a change of *figure*. The term of the motion flows on in any case;—time; or time and place; or time, place, and

figure ; underlying each of these accidents the substance itself remains the same.

(d) We arrive thus at the last mode of motion, in which the movement passes from one substance into another ; and we are asked to say how and why does it pass. I conceive that there is no more difficulty in answering this question, than there is in explaining how and why a wave or other motion passes within the same substance from one portion into another ;—for example, how and why waves pass in the sea. For, consider : it is universally recognised that there can be no passage of any accident, unless between substances which are in actual contact. If, then, the effect of contact be, to make substances one, which before contact were more than one ; there is no more difficulty in explaining how motion passes from a cue into a billiard-ball, than in understanding how the wave—or “virtue,” whatever it be—can be transmitted along the cue itself, from the butt to the point. That is, of course, on the supposition that the wood and ivory are made one by contact ; for, if the ivory becomes really one with the wood, there is no reason why the motion should stop at the tip of the cue.

IV.

Now, it seems to me quite plain that whenever two substances are in contact, they become in a true sense physically one. For, what is unity but the absence of a break or division ? But, there can be no complete break or division when substances are in contact.

Let there be no misapprehension here. I do not mean to contend that the unity thus produced is of a perfect kind ; that there does not remain a specific distinction between my foot and the earth with which it is brought into contact ; that two men do not remain really two

while they are shaking hands. I do not mean to advocate a perfect unity of this kind ; just as few will be found, I hope, to advocate a perfect separation. Are these men as completely separate as if their hands were not in contact ? If they are not quite one, nor yet quite separate, it follows that their unity as well as their diversity must be in some way incomplete.

It will be urged against this view of the matter, that the imperfect unity I advocate is unity of the individual, and that there can be no such unity as long as the species, and even the individual, remain distinct, as in the examples just given.

I acknowledge freely that a physical unity of the individual is the basis of my explanation ; be pleased, however, to remember that it is not unity of a *perfect* kind. It is an essential portion of my contention that individuals may be in one line truly distinct, while in another line there is no real distinction between them in the least. This may appear contradictory ; yet I am not without hope of showing by analogies that it is not really so.

In a previous Chapter of this Essay¹ the reader was asked to consider whether the human body remains individually and specifically the same after death. Of course, the species changes with the change of substantial form ; and with the change of species, of course, the individual changes too. There is, therefore, in one line, the most real distinction between the species and individuality of the corpse and of the living body. Will any Catholic writer venture to assert that no portion of the individuality of the living man remains after death ? Is it or is it not *that* corpse which was once living and will be raised again and endowed with glory on the last

¹ Ch. ii., note at end.

day? If it is *that*, then what about the individuality? And surely if the individual remains in some sort, the species also must remain in part.

The same truth,—that two substances may be really, though incompletely, one individual, while under a certain aspect they are also in a true sense individually and specifically distinct,—may be illustrated in a manner very much to our present purpose from what happens when one species of plant is grafted or budded on another. Take a case in which the branch of a pear-tree has been inserted into an apple stock; and ask yourself whether the whole tree, growing there before your eyes, is one individual or two. I maintain that in the tree before me there is a true individual, the individuality of which, however, is not quite complete. For, the apple stock is specifically different from the pear branches; and, of course, difference of individuality must follow diversity of kind. This supposes that in the plant, as it exists, there are two substantial forms, an apple form and a pear; and that, nevertheless, the two individual wholes are not altogether as distinct as are two other trees which do not touch one another. While distinct in the rounded species, the parts joined by grafting have something in common,—a continuity through the whole, of extension in a less specific mode.

The view of grafting here advocated is based on the principle that difference of individuality and of species come ultimately from different modes of extension in matter,—a truth which I regard as almost fundamental in the Philosophy of the School. It is well known that the Thomists have always traced difference of individuality to different modes of extension; but there may be a disposition to doubt or deny what is equally true,—that specific differences are due to the same cause. Of course, the formal principle, as it is called, of specific

differentiation is the form, substantial or accidental, according to the nature of the specific difference in question. At the same time it is quite true that matter becomes capable of receiving its various forms, only after its extension has been modified more or less differently; and thus the remote principle of specific differentiation in material things, is the mode of extension which the matter has attained.¹

Other illustrations might be given; I must content myself with one or two. It often happens in the vegetable order, and is not unknown in the world of sense, that a part or limb of an individual dies, without falling away completely from the trunk. Take the case of a tree on which there is a dead branch, and ask yourself: is that branch still really and physically one with the living tree? Trunk and limb have not the same substantial form, as is plain enough; no more than a dead tree has the same form which animated it during life. But, is the continuity as utterly and completely broken, as it is between two trees and their branches? I believe it is not; that at the point where life ceases in the wood, there is a break, indeed; which, however, is not thorough and complete. There is a cessation of that peculiar

¹ In his valuable work, *The Metaphysics of the School* (vol. iii., p. 106), Father Harper expresses the opinion that in case of grafting, there is only one substantial form throughout the whole tree. This, no doubt, is quite in conformity with the opinion held by the Jesuit writers generally regarding the principle of individuation of material things. For, manifestly, the tree is one individual, graft and stock; and it should be two, not one, if having two forms, each were to constitute its own individuation. But, really, it is unintelligible how the existence of specific difference can be proved at all, unless by arguments which apply equally to the apple and the pear portions of the tree in question. I know of no test of specific distinction in substances, unless it be specifically distinct actions. A tree is an apple or a pear tree, according as it is able to produce apple or pear effects. If this is the true test of specific difference in substances, when the substances are quite distinct, why does it not avail when they are in contact, or even grafted into one another?

mode of extension which is necessary for the living form ; but, underneath that specific mode there is a mode more generic, in which matter may be extended as a certain kind of wood ;--as beech, for instance, if the tree be a beech-tree. This generic mode of extension is continued in the dead branch. Hence trunk and branch are one continuous piece of beech-wood, as such ; of which, however, one portion is living, whilst the other is dead.

If this be not so, it must be said that there is no physical union between the dead branch and the trunk ; that there is no sense in which they form one real individual ;--a conclusion which I, at least, am not prepared to adopt. Nor do I think it lawful for any Catholic to extend the principle and maintain that there is no real physical continuity between the human body before death, after death, and after the resurrection.

In all the illustrations hitherto given, the continuity formed by contact is incomplete,—a generic sort of uninterruptedness. This is not due to any lack of examples of continuity complete and even individual, produced by contact ; it is due rather to the nature of the argument, which supposes some kind of continuity to be found even where the contiguous substances remain individually and specifically distinct. It may serve to illustrate and confirm the view I have been advocating, if I remind the reader of some cases in which complete individual unity is produced by contact.

Whenever separate masses of the same kind of liquid are brought into contact, this complete unification occurs. Pour wine from two vessels into one, and the result will be one individual mass of wine. A drop of rain becomes one individual with the water of the ocean into which it falls. So, too, if molten lead or iron be poured from a number of vessels into one, the result, after cooling, will

be one bar or lump of metal.¹ As unity is broken by breach of contact, so it is restored when the contact is renewed. If, then, the extension is continuous in kind and in individuality, the result will be a substance one in individuality as well as in kind. If, on the other hand, the extension does not remain completely unbroken, the unity will follow the nature of the extension,—will be generic, specific, or individual, according as the extension is continued in the mass.

V.

Returning, now, to the difficulty that is urged against the doctrine of the communication of motion, I am asked to explain how this accident can be transferred from one subject to another. I answer: there is no more transfer of motion from a cue into a billiard-ball, than there is from the butt to the tip of the cue. For, motion cannot pass from the cue to the ball, except during contact; and, whilst in contact, the two substances are in a true sense really one. They are not, indeed, one

¹ Here, again, I have to suppose that the parts—molecules or atoms—of which these bodies are composed, do not remain separate in the solid and liquid as they do in the gaseous state. This can hardly be called in doubt by any Catholic. The human body, at least, forms but one individual substance; and there is no true individuality of compound substances, according to the extreme form of the atomic theory referred to. When the defenders of the extreme view of complete separation between the ultimate particles of matter, come to decide whether the atom is really ultimate, and whether atoms are in contact in the molecule, there are few of them so bold as to push the theory to its extreme. Common sense asserts itself then. If you go on to ask what is the intrinsic constitution of an atom, you will find some of the very ablest men of science contending that, in all probability, atoms are but vortices in some absolutely continuous elastic medium, such as the ether. This medium, then, is it not matter? And what are its ultimate constituents? Not atoms, surely; inasmuch as the medium is more elementary than its vortex-motions, which are atoms. What, then, becomes of the atomic theory? Manifestly it does not supply us with a complete explanation of the nature of matter.

continuous piece of *wood*, or of *ivory* either ; but they are one continuous piece of *matter of some less specific kind*. Just as a pear tree grafted on an apple stock is not one continuous piece of apple-wood ; neither is it pear right through from root to tops ; it is, however, one continuous piece of *pyrus-wood*,—taking a denomination from the tribe of the order *roseaceae* to which both apple and pear belong. Or, to use another illustration, as a man's two eyes are two, not one, though parts of one continuous substance, the extension of which is not so peculiarly modified in the parts between the eyes, as it is in the eyes themselves ; so, matter under one mode of extension may continue unbroken, while, supervening on that unbroken mode, there are others which do not continue along the whole line.

This being so, we have merely to explain the manner in which motion passes within a continuous mass. The fact is undeniable ; for who can have any doubt that wave-forms are transferred continuously from place to place in the sea ? It remains, then, for those who do not see their way to admit the passage of movement from one substance to another, to join with us in seeking for the explanation of how it may pass within the same continuous mass. I purpose to give in the next Chapter the explanation that seems most reasonable to myself ; it will afford an opportunity of replying to some more of the arguments that have been urged against the kinetic theory.

NOTES TO CHAPTER IX.

I.

ST. THOMAS ON TRANSIENT ACCIDENTS.

ST. THOMAS expressly states that there are cases in which accidents pass from one substance into another, the second substance being specifically distinct from the first.

1. In explaining how substantial generation takes place in inorganic matter, he says that the elementary substances *remain virtually* in their compounds,—the “virtue” being a *quality that existed in the elements*. “Sicut, igitur, extrema inveniuntur in medio quod participat utriusque naturam, sic qualitates simplicium corporum inveniuntur in propria qualitate corporis mixti. Qualitas autem corporis simplicis est quidem aliud a forma substantiali ipsius, agit tamen in virtute formae substantialis. . . . Sic igitur *virtutes formarum substantialium simplicium corporum salvantur in corporibus mixtis*. *Sunt igitur formae elementorum in mixtis, non actu sed virtute.*” *Opusc.* 33, aliter 29.

2. He repeats over and over that in the generation of living things the sperm acts by a “virtue” derived from the parent, as from its principal. It is by this “virtue” that the sperm is able to generate a form superior to its own; *e.g.* the sperm of a horse, though not a horse, is able to produce a horse. This “virtue” continues the same during the many stages through which the foetus passes. Yet, the “virtue” infused into the sperm is an accident,—a quality. See Harper, *Metaphysics of the School*. (Vol. iii., p. 76.) “The form of the intermediate cause, by virtue of its procession from the principal agent,—the substantial form of the parent,—is endowed with *properties which continue in their essential nature throughout the successive substantial changes* up to the ultimate development [of the foetus,] and gradually organize the matter for higher and higher forms of life. . . . *These qualitative accidents* are above the exigency of any one of the provisional forms, and *work on under each* towards the attainment of the ultimate and perfect substance.”

3. The same is true of all instrumental causality. An instrument produces its effect only through the “virtue” of the principal agent. This “virtue” is an accident, and remains the same till the effect is produced, no matter how many instruments may intervene. I write by holding a pen, which moves ink, and so on. In more complex writing instruments, such as type-writers or certain telegraphic

machines, the number of media is much greater. But the higher effect—writing—is in each case produced by a higher “virtue” that emanated from the principal, and continues unchanged to the end of the series.

II.

ARISTOTLE AND ST. THOMAS ON THE SUBJECT OF TRANSIENT ACTIONS.

THERE are some expressions used both by St. Thomas and by Aristotle with regard to transient actions, which, as they seem at first sight contrary to the body of the teaching of these masters as represented in this Essay, ought not to be passed over without explanation. I could not introduce this matter into the text without too great an interference with the chain of reasoning pursued therein; it only remains to add a note in which the question can be more fully and freely treated.

1. In the first place, both these great philosophers expressly teach that transient motions or actions are subjected, not in the mover or agent, but in the object moved or acted on. Thus, in his treatise *De Anima* the Stagyrte remarks: “The operation of an agent and mover is produced in the object acted on:” ἡ γὰρ τοῦ ποιητικῶν καὶ κινητικῶν ἐνέργεια ἐν τῷ πάσχοντι ἐγγίνεται, 1. 3, c. 2.

This is quite in conformity with what he lays down in the third book of the *Physics*; to which I called the reader's attention in the Second Chapter of this Essay. “Motion” is the act of a movable thing, precisely as it is movable; hence “*movement is in the movable*, for it is its act; . . . and the act of the mover is not different.” In connection with this passage the Philosopher proposes to himself the following difficulty. If action and being acted on are the same motion, this must reside in some one subject, either in the agent or the recipient. Being motion, however, it must, according to the doctrine laid down here, reside in what is

moved ; therefore the action of an agent is subjected in the object which receives the action. The conclusion presents no difficulty to Aristotle ; though, it might be contended, it must seem false and even ridiculous to one who believes in the kinetic theory of activity. See p. 188.

Commenting on these and similar passages in the works of Aristotle, St. Thomas invariably adopts and illustrates the teaching of his master. The formula of the Angelic Doctor is, that "action is *from the agent* as from its principle, but is *in the recipient as in its subject*." "Idem actus est hujus, idest, agentis, ut a quo ; et tamen est in patiente ut receptus in eo." (In Phys. Arist. Lect. 5, n. 9.) This is repeated in many forms, and in almost every one of the works of St. Thomas. Thus for instance, in the *Summa* he writes : "Action is of two kinds ; of which one proceeds from the agent into some exterior object, as in burning and cutting. . . . An operation of this kind is not an act and perfection of the agent, but rather of the recipient. There is another kind of action which remains within the agent, as feeling, thinking, willing ; and these are perfections and acts of the agent." "Duplex est actio. Una quae procedit ab operante in exteriorem materiam, sicut urere et secare . . . Talis operatio non est actus et perfectio agentis, sed magis patientis, . . . Alia est actio manens in ipso agente, ut sentire, intelligere, et velle ; et hujusmodi actio est perfectio et actus agentis" (1, 2, q. 3. art. 2. ad. 3.)

The holy Doctor denies that the act of cutting is a perfection of the thing that cuts ; the reason being the principle already laid down, that the action of cutting, is not in the agent, but rather in whatever receives the motion. It is urged that this doctrine cannot be reconciled with the theory of the transmission of motion. For, if motion be really transferred,—say, from a saw to a block of wood,—it must have been at first in the saw, which must have been perfected by having it. This is the difficulty that has to be explained.

2. Before proceeding to point out the true meaning of these passages, I would beg to ask any sensible man whether

he really believes that, when a carpenter saws wood, there is not motion in the man's arm, but only in the wood. Nay, not even there. For it is proved by experiment that the wood cannot retain its motion, any more than a heated bar of iron can retain its heat.

In every case the motion must pass into whatever is in contact with the subject. Whether it passes by transfer or by production I care not just now; it must pass in some way, and must move something else. Seeing, therefore,—that each successive recipient becomes an agent in turn, if the motion can be subjected only in a recipient which is not an agent, it never can find a subject in which it may be sustained. I, for one, refuse to believe that either Aristotle or St. Thomas held any doctrine which would justify such conclusions as these.

The direct explanation of what the two great masters wish to convey, is easy enough, if one only bears in mind that mechanical motions are always passing, so that the recipient of one instant becomes the agent of the next. The saw receives its motion from the carpenter, but transfers the gift immediately to the wood; the wood receives it from the saw, and transfers it to the bench; and so on in an endless round of change.

At every instant the motion is in some subject, which is both agent and recipient; yet, as regards the motion which a subject actually sustains, it is, while sustaining it, more recipient than agent. For, an agent is one that transmits, while a recipient is one who receives. Motion, however, precisely as in a subject, is rather received than transmitted; for if it were transmitted, it should be no longer there. Hence, the two great masters are quite correct in teaching that the subject of a motion or action is rather the recipient than the agent; for, an agent is denominated an agent only because—and consequently, *after*, at least *instante rationis*—it has passed its motion on. It is quite consistent with this that what is in this instant a recipient, should be an agent in the next; and thus motion or action would truly pass from

subject to subject, though its subject at any one instant should be considered as being acted on by another, rather than as being itself in motion.

Hence, it is not surprising that St. Thomas should be found to teach expressly in many places that agents are true subjects of the actions they perform. Thus: “since *action is in the agent* and *passio* in the recipient, what is action and what is *passio* cannot be the same individual accident; for, an accident cannot be in two different subjects.” From which he concludes that the crucifixion of our Lord may not have been meritorious in His executioners, although the reception of the torture they inflicted was meritorious in Christ. Again: “an action which is not the substance of the agent, is in it as an accident in its subject; wherefore action is reckoned among the nine categories of accidents.” “Cum actio sit in agente et passio in patiente, non potest esse idem numero accidens quod est actio et quod est passio, cum unum accidens non possit esse in diversis subjectis” (2 *Dist.* 40, q. 1, art. 4, ad. 1.)—“Actio quae non est substantia agentis inest ei sicut accidens subjecto; unde et actio inter novem praedicamenta accidentis computatur” (*Contra Gent.* 2, cap. 9.)

But it is altogether too manifest that agents are in some way the subjects of their transient actions,—while these motions are in the agents, and before they have been transferred.

CHAPTER X.

RESISTANCE.

I.

THE object of this Chapter is to explain, as far as such a very obscure matter is capable of explanation, how wave-motion passes from part to part within the same continuous mass. The commonest examples are best suited for the purpose of analysis: you can think of sea-waves, or of the vibrations caused by percussion in the string of a violin, or of the motion of a rope held at one end and jerked from the hand. Though the molecules of which the atmosphere is composed are not continuous, yet the same principles will apply to the vibrations by means of which sound is conveyed in the air, as to motions that are transmitted from part to part of masses that are continuous in the strictest sense.

I have already referred more than once to the fact that very many of those who have devoted their lives in recent times to physical research, object to the supposition that matter is in any case continuous. The tendency is to extend the kinetic theory of gases to liquids and solids; so that the densest metals would be considered nothing more than gases, the molecules of which are very closely compressed by some kind of force.

I have not the least sympathy with this view, as far as liquids and solids are concerned: it is not necessary to enter into a discussion of the matter here. Waves of sound pass in the atmosphere, although it is a gas, and, as I freely admit, not one continuous substance. But even the most advanced of the moderns will acknowledge that one molecule of a gas cannot communicate its motion to another, until the two have got into contact;

and when this occurs, the particles in contact are one continuous mass. Even in gases, therefore, there always is and must be sufficient continuity to supply us with a basis of inquiry as to how motion passes from one of two molecules in contact into the other. At the instant of contact the two are one continuous body ; how does the motion pass from part to part of this ?

Now, I have no doubt that many who may happen to read this Essay, will smile at the simplicity of one who finds himself puzzled over the question, how a wave may pass in a body of water, or how one end of a rod is moved when the other end has been put into motion. The answer seems so easy : the water is moved by the wind ; the rod by the hand ; this in its turn is put in motion by some "force" within its substance. Everything seems so plain, if one only gets a good clear conception of the idea of "force."

Well, I must confess that I have tried to realize that idea as vividly as possible ; and that, nevertheless, this matter of motion remains very mysterious to me. I do not want to insist now on what is the main contention of this Essay, that there is no proof of the existence of "force" as a reality distinct from motion. Let it be granted that there is such a reality as the advocates of the dynamic theory are wont to insist on ; the question still remains : how is it able to produce new figures or new positions, in water, in wood, or in the human arm ?

Let it be borne well in mind that if in any of these substances all motions were to stop at any two different instants, there should be left behind, as it were crystalized in the substance, different figures and positions for each instant of the two. New positions, figures, and such things, are not nothing ; they are great realities. Accordingly, we are face to face with this question : how can "force," which is not a position or a figure, and has

not either to give,—how can it succeed in producing positions and figures in a substance at certain points of time? I can form some notion of how a reality can flow from where it is: but how can it be produced *de novo* by something in which it did not already exist? It may be true that these realities are so produced by “forces”; but surely, if true, it is not free from mystery.

You may possibly say that “force” produces accidents, somewhat as God creates substances. This, however, is only to make the mystery more profound. For, the creative action of God, so far from being easy to understand, is the most unintelligible of all the obscure relations which subsist between the finite and the Infinite. We see that it must be so; but how it is, we cannot in the least imagine. It is, we know, due in some way to the infinite fertility of the divine activity; which, being substantial, can communicate itself, not as accident only, but as substance,—a substance which is very different from the divine substance itself. We acknowledge that there is no arguing in this matter from the limitation of the finite to what may or may not be possible to the Infinite. We find that substances have been produced and are being produced daily; and we say that there must be some way in which the thing can be done. Which is the way, who shall attempt to explain?

The object of these remarks is to get the reader to feel within himself that this matter, which at first sight seems so simple, is, like all things elementary, full of the deepest mystery. I do not pretend that the explanation I am about to submit is of such a character as that, even if it be true, it will clear up all obscurities. I am not very sure that it is true; in these matters it is only the very thoughtless who are very sure. That motion

passes from part to part along continuous substances, is as plain to me as that there is motion at all. My contention is, that it can as easily pass from one substance into another during physical contact, inasmuch as the two are then in a true sense one continuous mass.

If I go on to say how I imagine motions to pass from part to part of the same individual, I do so knowing full well that this must be a mysterious process, whatever view may be taken of the genesis of motions ; yet in hope that some light may be thrown were it on ever so small a portion of this dark continent of physical science. If this hope should be disappointed, my main contention remains quite unshaken,—that motions really pass ; and that, if they pass in one case, there is no reason why in the other they may not do the same.

II.

Coming, therefore, to the question proposed, I will ask you to take the case of a rod of some kind,—a billiard-cue for instance,—touched at one end by a body in motion, let us say, by a human arm. It seems to me that there is one condition required for the passage of this motion to the other end of the cue,—resistance in both substances. If, in addition, the movement should not continue in a perfectly straight line throughout, but should—as happens in almost, if not quite every case—take the form of vibrations or of waves, a second condition will be found to be invariably present ;—there will be a want of absolute or utter continuity in the substance of the rod. The parts of which it is composed, and into which it may be divided, are one continuous mass, indeed ; but they will be found to be so only after an imperfect manner. The substance will be like a

sponge ; it will run in lines, as it were ; interlaced with which will be found other lines and spaces, either absolutely vacant or filled with substances of a different kind.

1. That resistance is required for the transmission of motion, we learn more or less by experience, after which it may be proved *a priori*. When I take hold of the butt-end of a cue, and move it forward, I move the top also. This could not be, if the substance of the cue were not impenetrable ;—if butt and top found no obstacle to their running into the middle and into one another, so that no portion would exclusively occupy any part of space. The softer a mass of matter is,—the less resistance it offers to penetration from without,—the more useless it is as a means of transmitting motion. Iron or brass would lose much of its efficacy as a hammer or a battering-ram, if either were reduced to the gaseous or even to the liquid state.

Of course it is true that even liquids and gases may serve as media for the transmission of motions. The waves of the sea work great changes on the most rock-bound coasts ; high winds blow down trees, and have been known to overturn objects much more firmly fixed ; the force whereby projectiles are hurled forward, is derived from the motion of highly compressed gas.

This is no more than saying that matter in all its conditions is in itself equally impenetrable, equally capable of resistance ; and that it is the absence of matter in the vacant spaces which gives rise to what are called softness and penetrability. The more condensed a material substance is, the smaller the amount of space vacant within its apparent volume, and consequently the less soft and penetrable it is.¹ Solids are very much condensed as

¹ This is said without prejudice to the question whether there is in the world around us any portion of space not actually occupied by some matter of a more or less subtle character. Should it be that the interspaces of the grosser forms of matter, such as iron and stone, are absolutely filled with

compared with the same substances in the liquid state ; and so are liquids when compared with gases. But neither solid, liquid, nor gas, could serve as a medium for transmitting motion, unless the parts of which all are composed were mutually exclusive ;—unless each part resisted encroachment of the others on the portion of space it actually occupies.

In Catholic Theology angels and disembodied spirits are, at least in their ordinary state, endowed with no resistance ; hence they do not jostle one another, but pass through without the least difficulty ; and we should consider it ridiculous to think of knocking a man down by throwing his guardian angel against him. One can be, and sometimes is, thrown down by the atmosphere, symbol as it is to us of spiritual substances ; but, then, the atmosphere is not a true spirit, but only a symbol of spiritual things. The true spirit produces absolutely no impression on our senses, for the simple reason that it is not able to resist them, so as to exclude them from the space it occupies already or is about to occupy.

2. It is somewhat more difficult to conceive why it is that want of utter continuity—the existence of matter in a sort of spongy state—should be necessary for the transmission of motion by way of vibrations or of waves. It will be found to depend in some way on the property just referred to, of resistance or impenetrability. In an absolutely homogeneous and utterly continuous substance, no part can move in the inner portions of the mass, until the surface has been first bulged out at some point.

For, the matter of which the mass is composed being absolutely impenetrable, each part of it resists most

fluids of a subtler kind, these fluids must serve as vacant spaces, owing to the greater rapidity with which they are capable of being moved ; as a sponge is not much harder for being filled with water or with air.

efficaciously the efforts made by any other part to encroach on the space it occupies. Hence, before any portion can move in the inner regions of the mass, the part adjacent must have yielded space, by moving from the position it occupied; this, however, supposes the part next adjacent to have moved out of its position; and so on till the surface is reached, where the extreme parts of the substance may be bulged out into an unoccupied territory. I will try by means of illustrations to make my meaning clear.

(a) It has been supposed by some that gravitation may be due to vibrations in an absolutely continuous ether. I am not now concerned with the truth or falsehood of this theory; but supposing there were a vast ocean of such an ether, as large as the universe, and that somewhere towards its centre our earth were immersed, I do not see how the earth itself or anything on it could make the least movement, unless at the very same instant the surface of the vast ether-ocean were bulged out at some point. Let us suppose there are men on the earth, and that one of them wishes to move his arm: how can he do so, unless he displaces the ether? And where is this to go, unless free space has been provided for it by displacement further on? And so on and on until we come to the surface, where there is space hitherto unoccupied into which the material may be bulged. Motion in such a mass would take no time to travel, the reason being that there are no vacant spaces to be filled up *en route*.

(b) Again, we may suppose the existence of a rod the substance of which is absolutely continuous, without the smallest pore. We may, moreover, suppose our rod to be absolutely rigid, in the sense of being utterly incapable of the least bulge laterally in any direction. If, then, one end of such a rod were moved towards the location

of the other end, there could be neither wave nor vibration, but a simultaneous change of position of all the parts from end to end, no matter how long the rod may be supposed to be. The reason is the same as in the last hypothesis. As there can be no lateral motion in any direction, and as there are no vacant spaces within the substance of the rod ; when a part, A, of the material moves in the direction of an adjacent part, B, it must pass into a position already occupied by B. But since B resists, it must have moved away from the position in question, before A can enter in. That B should be able to move, the next adjacent portion, C, must have yielded its position ;—and so on to the end of the rod. So that there is no possibility of the least motion in the line of the rod towards either end, unless the whole mass be simultaneously moved.

Something similar may be witnessed as quite an ordinary phenomenon at any railway station. The carriages of which passenger trains are composed are, as a rule, bound rigidly together ; hence, the last carriage is moved or brought to a stop almost simultaneously with the engine. Goods trains, on the contrary, are connected by chains, that leave vacant spaces, as it were, between the waggons. For this reason it often takes quite an interval for the motion of the engine to reach the last waggon ; and one may notice the movement passing in a kind of wave along the train. There is a similar difference between the action of the rigid rods and levers that work the switches, and that of the ropes by which the signals are regulated. With the levers there is little time lost, because there are comparatively few and unimportant hollows, as it were, to be filled up in the line of communication ; whereas one can notice a distinct straightening in the case of the ropes, and a consequent filling in of spaces vacant before the cord was strained.

(c) The hypotheses already made—of the ether-ocean and of the rod, the substance of both being supposed to be absolutely continuous—illustrate the mode of transmission of motion by way of vibration within a mass. There can be no vibration where there is absolute continuity. That any one particle of such a mass may be able to move in any direction, it is necessary that the whole mass in front of the particle in the direction towards which the motion tends, should be simultaneously moved. This supposes, in the case of the rod, that there is no possibility of lateral bulging; and in the case of the ether ocean, that there is equal pressure at every point of its surface.

I will ask the reader to vary the supposition somewhat. Let the rod be a perfect cylinder; and let the pressure on it from without be equal at all points, or let there be absolutely no pressure; and let the end towards which the motion tends be fixed absolutely, so as to be incapable of the least further motion in that direction. It seems to me that, if such a rod in such circumstances were pressed from the end that is free towards the other end, which is supposed to be fixed, and if this pressure were exerted absolutely in the line of the rod, the result would be a shortening and thickening of the mass. The thickening would be equal all along the line; it would not be more at any one point of the convex surface than at the other; at least it would not be propagated in a wave along the surface of the cylinder, but would either be confined to the place where the impelling power was applied; or if it extended along the entire surface,—as I am convinced it would,—the amount of thickening at any one instant would be equal at every point.

It is impossible, of course, to prove this by actual experiment, inasmuch as it is altogether out of our power to provide an absolutely continuous substance; and as

for pressure from without, we cannot equalize it, or direct it in an absolutely straight line, much less do away with it altogether. We have no means of insulating matter from the action of gravitation, and in certain respects we have even less control over the kindred forces of cohesion and affinity. Hence we can only argue *a priori*, and be guided by analogies; and all our experience seems to prove that the closer and denser a piece of matter is, the less liable it is to wave in a lateral direction, and the more likely to transmit its energies as vibrations within its own mass.

(d) We might go much farther in this process of framing hypotheses; I will ask you to consider but one more. Let the rod be no longer a single cylinder, such as has just been represented; but let it be made up of a number of cylinders lying parallel to one another, more or less like the tubes of a machine-gun, or the boiler of a locomotive. These rods might lie close to one another, still so as not to touch; and let the whole collection be fixed at one end. If, now, the combination be supposed to be pushed with absolute accuracy in a straight line from the end that is free towards the other end, there would be no wave-motion, but only a thickening at the point where the force is applied; or, as I think much more probable, along the whole line, equally at every point for the same instant of time. It would be so in one rod, as has been said; the same reason applies to all.

But if, instead of lying perfectly parallel, the rods were to depart from the straight line here and there, running from side to side at all kinds of angles; it is easy to see that the result of a push on such a piece of matter would be to cause a greater or less deflection at every angle along the line. The whole mass would act as a system of levers; the various parts acted on would be

carried in the direction of the resultant in each constituent system ; and that direction would rarely be the same as the line of the rod considered as a whole. This enables us to realize somewhat, how different forms of porosity in a piece of matter may affect the transmission of motions either as vibrations within the mass or as surface-waves.

III.

Interesting as are the questions that might be raised with regard to the second condition of wave-motion,—want of absolute continuity in the moving mass,—it is rather the first, resistance or impenetrability, which most directly bears on the subject of this Essay ; particularly as the advocates of the dynamic theory are wont to rely a good deal on this very resistance in support of their view.

1. The pen which I hold does not allow my fingers to meet ; it resists their pressure, and will not allow them to pass through its substance. The same happens when I press my foot on the ground, or strike a billiard-ball with a cue, or endeavour to move any piece of matter by pushing it or striking it ; the earth, the ivory, the thing pushed or struck in general, resists the motion of the pusher or striker ; and this resistance takes place apparently without any motion. Suppose an iron plate to remain perfectly fixed but motionless, would it not be able to resist the pressure of a man's hand ? Therefore, it is contended, resistance may occur where there is no motion ; and, as resistance is the exercise of a force, it follows that where there is no motion, there may be a "force" energizing very actively indeed.

This argument, in itself so obvious and so much to

the purpose, is urged by Fr. Pesch in more than one place. Thus he writes :—

“ In order that local motion may be propagated and received by a recipient, it requires resistance ; *i.e.* some hindrance to compenetration ; but does not this prove beyond doubt the existence of some active principle ? ”¹

The argument is not well put ; for, no one now really denies “ the existence of an active principle ” ; what is denied is, the existence of an active principle really distinct from the habitual power of the substance, as well as from its motion. The contention is, that, given an impenetrable substance, which is put in motion towards a space occupied by another substance equally impenetrable, the former by its motion, and on condition of the impenetrability of both, tends to displace the latter. The *active principle* of this change of place is the substance itself with its faculties ; the *action* is the motion of the same ; and there is nothing more.

But, Fr. Pesch might say, the substance which is displaced *resists* the motion ; and, in the case already given of an immovably fixed iron plate, the resistance takes place without a movement of the smallest kind. Let us examine, then, more closely the nature of this resistance ; let us see whether it is true, as contended, that a body may resist the encroachment of another, by actually exercising “ force,” without being locally moved. If this be so, I am prepared to admit that it is subversive of my whole position. I have been asking for an example of a “ force ” which is actual and yet distinct from motion. If there be one such,—resistance,—it remains for me to acknowledge that the

¹ “ Motus localis, ut propagetur et recipiatur in recipiente, requirit *resistentiam* *i.e.*, impedimentum quoddam compenetrationis ; sed haec nonne principium aliquod activum certo certius demonstrat ? ” *Inst. Phil. Nat.* n. 61.

arguments on which I have been relying are, in this case at least, proved to be fallacious; and it is not unreasonable to suppose, until proof is given to the contrary, that all other forces are in their nature more or less like what resistance is.

2. Now, I suspect, it would seem to many not only a novel but a very dangerous opinion, which would represent resistance as not an active "force" really distinct from motion, nay not even a physical reality of any kind whatsoever. I press with my hand on an iron plate, which is supposed to be absolutely fixed and motionless; the hand is excluded from the place occupied by the iron,—is reflected in some measure; but the reflection is not due to any "force," nor even to any physical reality, in the plate. So, too, if a mirror be supposed to be perfectly hard and polished, incapable of bending in the least under the force of the vibrations of ether; rays of light will be reflected from the surface of the mirror, but by their own force and not by any "force" within the glass. Similarly, if an elastic ball be dropped on a perfectly hard pavement, the surface of which is incapable of yielding in the least to pressure from without; the ball will be reflected by the amount of its own motion, but will receive no additional impulse from any "force" within the substance of which the pavement is composed. This is the doctrine which I venture to advocate with all due submission; it is directly contradictory and even contrary to the notion that prevails commonly, and which is used as a basis of argument by those who maintain that "force" and motion are really distinct.

(a) Apart from authority, it seems to me that it may be proved conclusively from the principles of Physics, that resistance is not a positive, physical reality of any kind. It is admitted by every one that, if resistance be positive and physical, it must consist either in motion or in a

“force,” the exercise of which causes movement in the body to which resistance is offered. Now, that resistance is not motion is evident from the fact that it is present in substances in inverse ratio to the movableness of the subject. The less capable the parts of a body are of being moved from their present position, the harder the body is ;—that is, the more impenetrability or power of resistance it possesses. In the supposed example of an utterly immovable iron plate, there is absolute impenetrability or resistance in the metal, because there is in it utter immovability. It is manifest, therefore, that resistance is not motion.

Neither is it a “force” such as may be capable of producing motion in an impinging substance. The reason is simple. There is no agent but one, the Immoveable, capable of acting without getting into motion. It is impossible to conceive a piece of matter causing motion in another piece, while within its own substance it remains unmoved. The most powerful explosive that exists, is perfectly harmless as long as it remains still ; it is only by moving that it is able to exert its force. The immovable plate, however, resists without moving in the least.

Accordingly, resistance is neither motion itself, nor a “force” such as may be capable of causing motion ; and there is nothing else of a physical character which it can be said to be.

The same truth may be deduced in another way, from principles which, I imagine, will be admitted as holding true in all cases of impact or collision. It seems to me that, when one body impinges on or collides with another, each has immediately after the impact the same amount of motion that it had immediately before, plus what it received from, and minus what it communicated to the other body. It is supposed that not only molar but molecular motion is taken into account.

Conceive the following case : a perfectly smooth billiard-table, balls absolutely hard, and no atmosphere or other impediment to their movements. In such circumstances should one ball in motion collide against another at rest, and should the two be found to move after the collision, the sum of their motions would be just equal to the amount which was in the mover before the collision took place. If the balls should go on colliding against others and others, moving them from a state of repose, so that after a time a hundred balls or a thousand—any number—should be moving on the table, the sum of motion present would still continue the same ; the movement in each ball growing gradually less after every collision with another in repose.

Something like this actually happens when molar motion is changed into molecular, as when an anvil is struck with a hammer. Not the least fraction is lost of the motion of the striker's arm ; it is found in the heat and other molecular motions developed in the hammer and the anvil. We are convinced not only that the motion is all there, but that there is no additional heat or other movement in either substance, beyond what it had before the action took place.

Similarly, if on our ideal billiard-table there were a collision between two balls, both of which were moving immediately before the instant of impact, we should expect the result to be a possible change in their relative velocities, but not in the total amount of motion in both. What before the impact was moving rapidly, might now have lost or almost lost its motion ; but whatever it has lost the other will surely have gained,—the same amount exactly, neither more nor less.

Suppose now that a perfectly hard ball, instead of colliding with another ball, which is capable of motion, were to fall on a slab which is absolutely incapable of either

molecular or molar change; the result would be a reflection of the ball with the same velocity precisely as it had before the impact. For, the motion of the ball would remain in some form; and as it can produce absolutely no change in the immovable slab, and as the ball itself, being absolutely hard, is incapable of molecular change, the molar motion which it had at the moment of impact, should remain as molar motion within it, the direction only of the movement being changed. The ball would thus be reflected without loss of velocity.

Here, accordingly, is a case in which resistance would take place in the most absolute and perfect manner, without the least action in the resisting object. There can be no action where there is no motion; and the slab in the illustration is supposed to be absolutely fixed.¹

(b) The foregoing doctrine may seem to contradict the axiom that action and reaction are equal and opposite. I should like to inquire whether the axiom holds merely for the present condition of material things, or is it based on any necessary property of matter. It seems to me that there is no reason why God might not create bodies and move them, so that they would

¹ Compare the illustration given by Aristotle (Phys. Lib. 8, c. 4):

"When a ball rebounds, it is not moved by the wall, but by him who threw it: ἡ ἀνακλασθῆῖσα σφαῖρα οὐχ ὑπὸ τοῦ τοίχου ἐκινήθη, ἀλλ' ὑπὸ τοῦ βάλλοντος. On this passage, St. Thomas comments as follows: "If a ball rebound from a wall, it is moved indeed *per accidens* by the wall, but not *per se*; it is moved *per se* by whatever threw it first. For the wall has not given it any impulse to motion, but only the thrower; and it was *per accidens* that, when it was prevented by the wall from being borne on according to its first impulse, this same impulse remaining, it [the ball] rebounds with a contrary motion." "Si sphaera, idest pila, percutiatur a pariete, per accidens quidem mota est a pariete, non autem per se; sed a primo projiciente per se mota est. Paries enim non dedit ei aliquem impetum ad motum, sed projiciens; per accidens autem fuit, quod dum a pariete impediretur ne secundum impetum ferretur, eodem impetu manente, in contrarium motum resilivit" See *infra*, chapter xi., p. 271.

act on one another without any reaction. On the contrary, I do not see how even He could arrange that one piece of matter should be the physical cause of motion in another, unless both were endowed with resistance. If this be so, resistance does not necessarily imply reaction, however closely the two may be associated in matter, as it exists in the actual universe around us.

If you lift a stone and allow it to rest on your hand, it presses on the palm with a force equal to that which you are exerting at the same instant. Would it press if there were no such thing as gravitation? And is gravitation so necessarily connected with matter, as that God could not produce a body which would have no such energy?

I shall have occasion a little later on to call attention to the nature of this and similar forces; and shall say now merely that, as far as physical science can conjecture, gravitation is due to pressure exerted from behind,—on the body in which gravitation is said to act; that as water is forced up in a pump by atmospheric pressure, so the atmosphere itself is pressed to the earth by some external agent. This may not be so; but if it is, and if God were to annihilate the agent which conveys the gravitation-motion, there would be no gravitation, and consequently no pressure of the stone on the hand. Nevertheless, the hand would act on the stone, lifting it and causing it to move. In other words, there would be action without reaction.

The same is true of other forms of activity. When a candle burns, the heat applied overcomes certain chemical affinities in the wax. We are not at all sure as to what chemical affinity is,—to what it is due. We can only conjecture as yet, just as with regard to gravitation. The most probable theory seems to be,

that the parts of a wax candle or of a lump of coal are pressed together by a force coming from without and acting behind each part, pushing them all inwards. Chemical affinity would thus be akin to gravitation; perhaps the two are but different modes of motion in the same medium; somewhat as light, heat, and (probably) electricity and magnetism, are but different forms of vibration in the luminiferous ether.¹

If this or something like it should be the ultimate explanation of affinity, it is easy to see that decompositions and compositions could take place absolutely, without any of the reactions which are found in the present order. For, what is to keep God from creating matter where there would be no medium to convey these mechanical pressures? Or, might He not leave the medium as it is, and merely remove the pressure to which, in all probability, chemical affinity is due? If He were to do either, there would be no external pressure, and the parts of a body could not react in the least on any agent that would tend to separate them.

In a word, reaction is due in every case to a motion in a direction opposite to that of the action; take away the motion and the reaction ceases; it does not appear, however, that the resistance would cease. Resistance, therefore, and reaction are not quite the same thing.

It is true, of course, that the parts of bodies are kept in position at present by means of affinity. If a billiard-ball and cue were created in pure space, and not kept in shape by some special divine intervention, the least agitation would shake both into atoms. The result of the removal of affinity and gravitation would thus be, to destroy the capacity of bodies to sustain any stress. Still, however, any atoms into which they might be

¹ See *infra*, Ch. xi. v.

resolved, would not lose their power of resistance. And though, if a billiard-ball in pure space were struck by a cue, they should both be shivered thus into atoms ; yet, if the same ball in the same circumstances were pressed in equally from all directions, its volume would be diminished, but within that diminished volume it would resist the pressure. It would resist without the least reaction ; for reaction is essentially a rebound or motion backwards, and in the case before us the atoms of the ball could ultimately not move in the least, being pressed in equally in all directions.

I do not think, therefore, that the axiom, action and reaction are equal and opposite, holds true in every possible condition of material things ; neither, is reaction as necessary an accompaniment of transient physical activity as is resistance. If so, the two are essentially different, however closely they may be associated in the present condition of bodies.

IV.

I fear there are modern physicists who insist very strongly on the identity of force and motion, and who, nevertheless, seem to forget as completely as any Dynamist, that bodies are all the more capable of resistance the more immovable they are. It was not so with the Peripatetics, whom I shall now call in evidence, lest the doctrine I am advocating should prove too great a shock to the nerves of those who in latter times have devoted their talents to the elucidation and defence of the Philosophy of the School.

Suarez has a formal dissertation on the nature of resistance; and it is comforting to reflect that his opinion

does not differ materially from that which is here enunciated. His words are :—

“One thing may resist another in two ways ; first, formally, by immediate repugnance ; secondly, radically, and, as it were, by a diminution of the other's force. It is in this latter way . . . that amongst men one is said to resist another, when, by anticipating his adversary, he inflicts a wound, cuts off the adversary's hand, or diminishes his powers in any other manner. This kind of resistance is nothing else but an action.

“The other kind of resistance, however, *does not consist in action*. . . . Hence, neither of itself in the first instance, nor by any kind of consecutiveness, does this kind of resistance proceed from an active power, inasmuch as it is active. . . . With regard, therefore, to this form of resistance, it is said *not to consist in any positive action* proceeding from the power that is called the force of resistance ; but [should be conceived] as consisting rather *in the privation of action*. Hence, such resistance is rather *impotence*, or an *incapacity of some kind*, than a power properly so called ; wherefore, it should not be mentioned among the divisions of power.

“ . . . It consists, then, in a certain *formal impossibility* or *repugnance*, from which it comes that the action of the contrary agent is either impeded altogether, or becomes more slow and remiss. Thus, therefore, *this actual resistance does not consist in any second act of a positive character*, proceeding from the resisting power ; but rather *in the want, or the retardation, or abatement of the contrary action*. Hence, the power of resistance is not a faculty ordained of itself to [produce] this want or retardation of action ; inasmuch as a natural power is not ordained to [produce] a privation ; and therefore we say that this is *not so much a power as a want of power,—a kind of incapacity*.”¹

¹ “Duobus modis contingit unam rem alteri resistere : primo, formaliter per immediatam repugnantiam ; secundo, radicaliter et quasi per diminutionem virtutis activae rei. Hoc posteriori modo . . . inter homines unus dicitur resistere alteri, si anticipato vulnere abscindit manum, aut alio modo diminuit vires illius. Haec, ergo, resistentia revera non est nisi actio quaedam. At vero alius resistendi modus non consistit in actione. .

A difficulty at once suggests itself: if there be no active power, or force, or motion, within the body which resists, as such; is there not something in it owing to the influence of which the impinging substance is turned back? A ray of light falls on a mirror; it does not cease to exist, but is reflected at an angle equal to the angle of incidence. I drop a glass ball on a marble slab, and the ball rebounds. Is there not something in the mirror and in the marble that turns the motion backwards in either case?

Suarez was undoubtedly at a loss here; the laws of reflection were not known in his days as fully as more recent inquiries have revealed them. Moreover, to say the least, he had not a complete grasp of the theory of the conservation of energy; and was under the impression that transient actions might exist in one instant, and in the next cease altogether or in part. Hence, when he goes on to suggest four ways in which the reflection or rebound might be produced, his language ceases to be very intelligible. No wonder.

I do not propose to trouble the reader with any of these explanations, hoping that possibly I may be able to suggest one more in conformity with modern Kinetics.

Unde non per se primo nec consecutive provenit hic resistendi modus ex potentia activa, ut activa est. . . De hoc ergo resistendi modo dicendum est non consistere in aliquo actu positivo proveniente a virtute illa quae vis resistendi esse dicitur; consistere potius in privatione actus. Unde talis resistentia est potius impotentia, vel incapacitas quaedam, quam propria potentia; ideoque non debuit in divisione potentiae adjungi. . . Consistit ergo in quadam formali impossibilitate seu repugnantia, a qua provenit ut actio contraria agentis vel impediatur prorsus, vel retardatur ac remissior fiat. Sic ergo haec resistentia actualis non consistit in aliquo actu secundo positivo, proveniente a virtute resistiva, sed potius in carentia, aut retardatione, seu remissione contrariae actionis. Ideoque illa virtus resistendi non est facultas aliqua per se ordinata ad illam carentiam vel retardationem actionis; quia naturalis potentia non ordinatur per se ad aliquam privationem; et ideo dicimus hanc non tam esse potentiam quam impotentiam et quasi incapacitatem " Metaph. Disp. 43, S. I. nn. 8, &c.

I will merely ask you to bear well in mind the general principle, that actual resistance is not a physical reality; that it is not action so much as want of action. I shall have occasion a little later on¹ to show that it was from St. Thomas Suarez got this notion of resistance. If, therefore, the doctrine should seem strange, even uncatholic and quite in contradiction to your idea of force; may it not be that this idea of yours is not the same as prevailed with men so little subject to erratic or uncatholic notions as St. Thomas and Suarez?

V.

Bearing in mind that actual resistance, according to Suarez, is privative rather than positive, a want rather than an exercise of activity, we begin to see that, if the resisting agent has any influence on the reflection of motions, it must be altogether of the moral order. Let me explain.

1. It will, I think, be freely admitted by modern physicists, that it is natural and due to a ray of light not to cease to exist when it falls on the surface of a mirror. Since, then, owing to the resistance of the mercury, or of whatever else it may be of which the mirror is composed, the ether cannot keep on moving in the line of vibration, its only refuge is to turn backward at some angle. But *it is reflected* by the mirror? It is; not, however, by an action but by a privation; which is intelligible only on the supposition that God has given the mirror a right that the ether should not move on through the substance of the mercury.

¹ *Infra*, p. 231.

We find, accordingly, that it is a question of right. Now of these rights there are two ;—one in the vibrating ether, to continue to exist somewhere ; the other in the mirror, to exclude the ether from its place. It is, as I contend, God Himself who gave originally and conserves continually all rights and motions, however they may exist in the creatures to which they have been given by Him. When, therefore, in the natural conservation of this motion of light, the vibration—which God conserves, as He is bound to do—is brought into contact with something to which He also has given a right of excluding such wave-motions from its position in space, He is bound to act in such a manner as will secure to both substances the rights He gave to each. He does this by simply reflecting the motion of the ether.

There are, therefore, both a physical and a moral cause of the reflection of light. The physical cause is not any physical activity within the mirror,—in which, as has been so often said, there is rather physical privation than activity. It is the vibration itself ; which, falling on the polished surface, continues or flows on continuously in a different direction. This is the very essence of physical causality,—a continual flow of some accidental, ever-changing form, such as vibration in ether or the *ubi* of a ball. Of course, God concurs as a distinct physical agent ; His activity, however, is not distinct from that of the vibration itself. It is rather the very same reality, which He conserves ; so that His concurrence here, as elsewhere, is physical and immediate, the immediateness being one of virtue rather than of *supposit*, as was explained before.

Besides this physical causality there is a moral influence also,—a causality not of energy but of right. This is found in the mirror, and to some extent in the wave.

The substance of the mirror got from God impenetrability among its other properties. Out of respect for this right of impenetrability, God is bound to reflect the vibration, as an artillery officer might be bound to fire his cannon so that the missiles shall not violate the sanctity of a church. God never fails of His duty; and hence, whenever the motion which He conserves in one of His creatures, comes into conflict with the rights of another, He will make sure that the rights of both are kept inviolate.

It may seem very ridiculous to talk in this manner of the rights of light, glass, and such things. Nor, indeed, are they rights in the strict sense of the word; for, a strict right belongs only to an intelligent creature: neither is God bound ultimately except in consistency to Himself. This latter point has been explained already; I will only add with regard to the former, what all Catholics will understand, that conservation is *natural* and therefore *due* in some way even to brute matter. It is in the sense of the word, "due," that I understand the rights of which there is question here. If a vibration or a mirror may have something *due* to it, it has the same thing undoubtedly in some way as its *right*.

2. Before entering on this explanation I referred to a text of St. Thomas, which was evidently before the mind of Suarez while he was engaged in writing the passage quoted a few pages back. The words of the Angelic Doctor are :—

"In an action there may be resistance in two ways: first, on the part of the agent, when, for instance, his power is weakened by an agent to the contrary; secondly, on the part of the effect itself, when it is impeded by a contrary disposition.

"In every action wherein the agent is not acted on, the first kind of resistance does not occur, but only the second.

. . But an effect is impeded more by the subtraction of the power of the recipient than by way of contrary disposition."¹

Let the reader attend carefully to the latter of the two forms of resistance mentioned in this passage by the Angelic Doctor,—the resistance which consists in impeding an effect. It may occur in two ways, as is plain from the last sentence of the second paragraph ;—either by a subtraction of the passive power of the recipient, or by means of a contrary disposition. The first of these is represented as being the more effective of the two.

Now, if this subtraction of passive power in the recipient of an action, be not quite the same thing as the moral right that I have been advocating, it is something very different from the notion of resistance which commonly prevails. Certainly Suarez, who wrote with this passage before him, did not understand resistance of this kind to be a physical reality ; as, indeed how could *subtraction of a reality* be such ? Remember, moreover, that the agent is supposed not to be acted on. I claim, therefore, that as regards the fundamental principle on which this explanation is based,—resistance being due to a negation of physical reality, rather than to any physical “force” in substances,—St. Thomas and Suarez are both on my side.

Aristotle also is of the same opinion ; for, speaking of the case in which a ball rebounds from a wall against which it is thrown, he says that in the rebound “it is

¹“In aliqua actione potest esse resistentia dupliciter: uno modo ex parte agentis, quando scil. ex contrario agente virtus ipsius debilitatur; alio modo ex parte ipsius effectus, quando ex contraria dispositione impeditur effectus. In omni actione ubi agens non patitur, prima resistentia non habet locum sed solum secunda. . . Magis autem impeditur effectus per subtractionem potentiae recipientis quam per rationem contrariae dispositionis” 4 D. 11, q. 1., a. 3, q. 3, ad. 2.

not moved by the wall, but by him who threw it.”¹ He was not aware that, as things actually occur, the wall is acted on by the ball and reacts to an equal extent ; being bent, however slightly, by the action of the ball. This mistake, however, does not interfere with my contention, which is, that the Philosopher recognised resistance where he did not admit activity.

3. It may not be unnecessary here to remind the reader, that when we ascribe to a mirror or to a marble slab causality merely of the moral order, in regard to the motions which either is capable of reflecting, it is supposed that their substance is immovably fixed,—that they are made incapable of the slightest motion, especially of the kind which is known as molecular. The reason why resisting substances, as such, are incapable of physical causality, is, because, as such, they do not act ; for action and physical causality are the same thing. That they do not act is manifest ; for they are supposed to be so fixed as to be incapable of motion, and a body cannot act unless it moves. Hence, the utter exclusion of physical causality from resisting substances, depends on the exclusion of motion from the same.

Now, it is well known that, as a matter of fact, we never find in nature a substance which is absolutely incapable of being moved, either as a whole mass, or by receiving some change in the local relations of its parts. Any one wave of the sea may not seem to produce much impression on the rocks against which the water beats ; yet we perceive how, ultimately, deep indentations are made. Each wave must have done its work,—must have made some impression, however insignificant. In a similar manner we believe that each vibration of the ether, as it beats on the hardest and most polished

¹ See the text quoted at p. 223.

surface, makes a very tiny but very real impression on the shore against which it is dashed.

This being so, it follows that however it may be true in theory that resistance is merely a want of activity, and therefore a basis merely of moral causality ; as a matter of fact, since no piece of matter is utterly impenetrable, neither is it altogether inactive in its mode of resistance. Matter is impenetrable in the sense that no two pieces can be in the same place at the same time ; but it is not impenetrable in the sense of being immovable, either as to its mass or as to the arrangement of its parts. Resisting surfaces always suffer, in the sense of receiving motions from without ; which means that they act ; for, being acted on and action are the same motion. Every resisting surface, therefore, acts somewhat in its resistance ; and action is an exercise of physical causality. Hence, in every case of resistance of which we have any knowledge, there is not only moral causality but physical as well. This, however, is not due to resistance, as such ; but to the fact that in no substance with which we are acquainted is the power of resistance so complete as to exclude all possibility of even the smallest motion being received.

VI.

If resistance be thus negative rather than positive, at least as far as the physical order is concerned, there is no reason why God could not confer utter hardness, impenetrability, resistance, on pure space.¹ Suppose a particular portion of pure space to be bounded by reality ; as, for instance, absolute nothingness to the extent of a cubic foot within a mass of steel. There is nothing to keep God from laying down a law for Himself not to allow

¹ Read in this connection Suarez, *Met. D.* 18, S. 8, nn. 14, 15.

either matter or motion within that cubic foot of space. In accordance with His usual Providence He might be called on to move the steel, as also the ether wherewith the metal is saturated through all its pores. The motion thus communicated would in the course of time reach one of the boundaries of the pure space within. Here God is face to face, not with nothingness only, but with nothingness included within boundaries wherein is established a sanctuary made inviolable by Himself. If He is true to Himself, as He must be by His very nature, He will turn back the motion in this case, just as if it had fallen on a nucleus of matter of an utterly impenetrable kind.

1. The student of Catholic Theology may construct on this basis a theory that will render somewhat intelligible the resistance offered by the sacred species in the Sacrament of the Eucharist. The substance of bread, while it lasts, is impenetrable in the sense explained. Surely God can remove the substance in such a manner as to leave behind its quantity of space absolutely pure; somewhat as water passes from a sponge, and its place is taken by the same quantity of air. The sponge in the case of the consecrated species will be the ether, air, and other substances, with which the bread is saturated, and which may be supposed to hold the bread instead of being held by it. When the bread is removed, it must be further supposed that God does not allow any of the other substances, not even the ether, to occupy the vacant space;—as He need not allow air to enter into a sponge from which water has been expelled by pressure.

The "quantity" of the bread would thus be retained. Its boundaries would be conterminous with those of the surrounding substances,—ether, air, or whatever else may press upon it from without. There is, however, no reason why, even though there were no matter in

existence, God could not confer the right of resistance and impenetrability on certain portions of space. He might take a cubic foot of pure space and make it impenetrable, not utterly, but only after the pattern of bread. He does so when the space is actually occupied by the substance of bread ; if this merely involves the concession of a moral right, why could He not confer the same right when the substance has been removed? Why could He not, for instance, endow with impenetrability not merely one cubic foot of pure space, but two or a million such, separated from one another and arranged in many forms. This would be extension like the extension of bread, only somewhat coarser in the grain.

If God should, in the manner just described, endow any portions of pure space with impenetrability like that of bread, all motions coming from whatever quarter could no more pass the boundaries of the spaces thus kept inviolate, than they could if the substance of bread were there to block the way ;—no more than, in the example previously given, motion could pass from the steel into the impenetrable cubic foot of pure space which it is supposed to contain. And if this is possible where no bread existed antecedently to the divine interference, it would be much more possible should the space have been already occupied by bread. All that is needed is that God should annihilate the substance of the bread, leaving to the space it occupied all its rights of impenetrability.

2. Any one with the least turn for constructing theories in Kinetics, may, if he bears in mind the principle of the conservation of energy, readily convince himself that the “quantity” of pure space thus remaining after the removal of the substance of bread, may be changed in all its modes, just as if it still remained subjected in the bread. The immobility and impenetrability are neither

greater nor less after the change of substance than they were before. They are precisely the same, and the space to which they are due will yield equally in all directions to like quantities of pressure. It is susceptible, accordingly, not only of molecular but of molar motion ; and being itself impenetrable like bread, yet capable like bread of changing its position, it can communicate its motion to other things. Hence, it will reflect light, receive and communicate heat, and exercise all other qualities, just as bread ; for, qualities are best represented as forms or modes of extension.

According to this explanation the sacred species in the Eucharist would not be sustained by nothing. All the other accidents, besides extension, would be subjected in extension, of which the others are merely so many modes. Extension itself would be sustained in absolute nothingness. As for impenetrability, being a moral right which can only attach to a definite something or somewhere, I conceive it to be given to space only after this has been defined and individualized by extension. The space need not necessarily be extended in the strict sense of the term ; a cubic foot might be made impenetrable so as not to leave a vacant pore, as well as so that there would be vacant spaces after any given pattern : in either case it might be made impenetrable. When, however, impenetrability is continued in a space that had been previously occupied by a piece of bread, the definition of the place may be expected to follow the lines of the extension of the bread ; and so the impenetrability of the Eucharist, like its other accidents, would be subjected in extension.

3. I have no doubt that this teaching regarding the sacred species will strike many of our theologians as startling and uncatholic. It may help them to bear the shock, if they can be referred to something very like it,

not in the writings merely of Tongiorgi, Palmieri, and others, who may be thought to have had too great a leaning to the Cartesian Philosophy; but in the works of some who are acknowledged to be the safest guardians and the ablest exponents of the Catholic tradition. I will content myself with quoting the following from St. Thomas:—

“In this Sacrament [of the Eucharist] is the dimensive quantity of the bread or of the wine the subject of the other accidents? . . . I answer: *It must be held to be necessary that the other accidents which remain in this Sacrament, should subsist as in a subject in the dimensive quantity which remains of the bread or of the wine.*”¹

It is quite in keeping with this teaching of the Angelic Doctor, as indeed it is plainly suggested in the remainder of the Article from which I have quoted, that quantity alone of all the accidents should be capable of being sustained without a subject, even by the divine Omnipotence. In another place he observes: “It is not possible [even by a miracle] that this sensible whiteness should be individuated without quantity, although it is quite possible for quantity to be individuated without substance.”² Scotus, it is well known, held a different opinion, and drew after him nearly all the disciples of the greater master. Even the veterans of the Dominican household, who stood unflinchingly by their Angelic leader in so many conflicts, betook themselves on this field to the ranks of his adversaries. Capreolus, Ferrariensis, Marsilius, Soto, Ledesma, are mentioned by Suarez³ as conspicuous in their desertion. The

¹ “Utrum in hoc sacramento quantitas dimensiva panis vel vini sit aliorum accidentium subjectum? . . . Respondeo, dicendum quod necesse est accidentia alia quae remanent in hoc sacramento esse sicut in subjecto in quantitate dimensiva panis vel vini remanente” 3, q. 77, a. 2.

² Quodl. 7, art. 10

³ In 3 Part. D. 66, S. 3, n. 8.

Jesuit philosopher himself shows how small he is in comparison with St. Thomas, by dubbing as incredible this portion of the Angelic Doctor's teaching. Hervæus stood firm ; for which staunch service, whenever in future I meet with his name in a list of theologians no matter how distinguished, I shall take care to give him a special salute.

Remark here how this portion of St. Thomas's system fits in with the view I have all along ascribed to him regarding the nature of force. If he thought force different from motion, there would be no reason in the world why he should teach that God could not keep it in existence unsupported by quantity. But if, on the contrary, the Holy Doctor believed, as I contend he did, that actual force is nothing else than motion, it would necessarily follow that it could not be sustained even by Omnipotence without a basis of support. For, motion is but a mode, not an absolute accident ; and like all other modes it is incapable of existing outside a subject. There could not be *rate* of speed except in a moving object ; and as motion is but a mode of a similar kind, it could not exist unless there were something to be moved. Accordingly, it is unintelligible how St. Thomas could have maintained with regard to the sacramental species in the Eucharist, that extension alone could be sustained by God without a basis of support, unless he were of opinion also that force is a very different thing from the kind of reality which Dynamists make it out to be.

See, however, how time and the development of the physical sciences have vindicated the intellectual acumen of the Angel of the School. The qualities—weight, colour, heat, resistance, &c.—which others made so absolute, he relegated to the position of modes of quantity, which could no more be sustained outside their subject than any other mode. The tendency of all

science now is, to recognise in qualities merely so many modes of extension, which itself is a mode of quantity,—precisely what the holy Doctor taught. It must increase our reverence for and our wonder at the insight into nature which he possessed, when we call to mind how loud the moderns are in their own praise, for having rediscovered a little of what he, with the small means at his disposal, and by sheer force of almost angelical intuition, had seen so clearly more than seven centuries ago.

VII.

There is one other point in connection with the mystery of the Eucharist, on which it may be well to touch, especially as it serves to illustrate my view as to the nature of resistance. It is, the want of impenetrability with which the Body of Christ is endowed in its sacramental home. The reader who bears in mind what Suarez has written with regard to the negative character of resistance, will not be surprised at my speaking of its “want” as an “endowment.”

We have supposed that from within the sacramental quantity the substance of bread is removed, and that no other substance is put into the vacant place. The latter portion of the supposition does not hold in the case of the Eucharist. Christ's Body is put there, filling up every tiniest nook which before had contained the substance of bread. Hence two questions arise : first, why is that sacred Body not able to make itself felt by our senses? And secondly, why does it not exercise as much resistance, at least of the moral order, as would sustain the species of bread?

The answer to both these questions is easy, when one bears in mind what precisely resistance is in itself.

It is a right with which God endows certain substances or places, and which He is bound to respect, so as to stop all motions, or rather to change their directions, when they arrive at the boundaries of the sanctuaries on which this sacred right of inviolability has been conferred. Now, God was not from the beginning in any way bound to give rights of this kind ; nor is the bond in any case of so absolute a character as to continue in force in presence of a sufficient extrinsic reason which might supervene. He is bound or not bound to respect these rights, just as it seems good to Him, taking everything into account. He can make a body impenetrable or penetrable, just as may be demanded by the nature of things and by their surroundings as well. Catholic tradition has always held that Christ's Body in the Blessed Eucharist is subtle, like a spirit,—not impenetrable,—whereas the space in which it exists sacramentally is impenetrable in itself. So it has seemed good to God. Why? It was due to the Body of the Second Person of the Trinity, at least as it exists in this adorable mystery ; and, “O homo, tu quis es qui respondeas Deo?”

VIII.

I have diverged not a little in this Chapter from the point with which I proposed to deal ; let me, therefore, remind the reader of what the question is. It is this : in what manner precisely are wave-motions conveyed from part to part of a continuous mass? I have been contending that this continuous passage of a wave-form does not arise from the exercise within the mass of any “force” which is really distinct from motion. It arises altogether from this, that the substance in which the wave-form subsists, is continuously conserved—

R

which is the same as created—by God in positions which are ever varying, but without interruption in their variation. When the change of position is altogether forward, without any lateral bulging of any portion of the mass, motion is the result, but not in the form of a wave. For an undulatory movement it is requisite that some portion of the mass should be projected laterally as well as conveyed forward. This lateral projection arises naturally by reason of the vacant spaces which are found within every body, and which, by varying the direction of what may be called the fibres of the substance, varies the lines along which the different parts are moved. But whether to the front or to the side, motion of the whole mass invariably supposes, that the portions immediately adjacent resist encroachments on the part of one another, so that one cannot move until another has left a passage clear. This is secured by the resistance of matter, a quality which must not be conceived as of the nature of physical force, but rather as a negation in the physical order,—an impenetrability, due to a right of some kind.

Briefly, for the passage of motion from one part to another of a continuous mass, all that is required is, that the parts should be impenetrable, and that some one should be moved in the direction of the others; which means that it should be conserved in existence, or continuously created, by God, in a place previously occupied by one of the other parts of the mass.

If this be true, it follows that the passage of motion within a continuous body is not due in the least to any “force,” which is really distinct from motion. And, as it was demonstrated in the preceding Chapter that motion passes between two bodies in contact, in precisely the same manner as from part to part of one

continuous mass, the conclusion is evident, that no "force" really distinct from movement is needed for the communication of motion between two such bodies as a cue and a billiard-ball.

NOTES TO CHAPTER X.

1. ACTION OF MATERIAL FIRE ON SPIRITUAL SUBSTANCES.

Besides the doctrine regarding the Eucharistic species, there is another portion of the Catholic system on which light is thrown by the theory of resistance advocated in the foregoing Chapter. I refer to the action of matter on spirits, especially in connection with the fire of Hell.

Though not a dogma of faith, a denial of which would amount to heresy, it is the Catholic doctrine that spirits in Hell are tormented by a true material fire. "*Certa et catholica sententia est*," writes Suarez,¹ "*ignem inferni, qui paratus est diabolo et angelis ejus, ut in illo cruciantur, verum et proprium ignem corporeum esse. Hic est communis consensus Scholasticorum omnium . . . imo est communis sensus Ecclesiae et Catholicorum.*"

1. It has always been a question in the Catholic schools, how precisely a spirit can suffer from the action of material fire. In this connection St. Thomas has made some observations to which I would ask the reader's attention. In the *Summa Contra Gentiles*² he writes: "*Non sic aestimandum est quod substantiae incorporeae ab igne corporeo pati possint, quod eorum natura corrumpatur per ignem, vel alteretur, vel qualitercumque aliter transmutetur, sicut nunc nostra corpora corruptibilia patiuntur ab igne; substantiae*

¹ *De Angelis*, l. 8, c. 12, n. 9.

² L. 4, c. 90

enim corporeae non habent naturam corporalem, ut possint a rebus corporeis immutari."

In this passage the Saint denies that a spirit can suffer *alteration*,—a technical term for the reception of a new quality,—or be *corrupted* in any way, or *intrinsically changed*, by the action of a material substance. In the Commentary on the Distinctions¹ this doctrine is extended to matter even when used instrumentally by Almighty God.

In the latter place the holy Doctor goes on to explain his own notion as to how material fire torments the condemned spirits; it does so "by detaining them," and "restraining them from doing their own will,—from acting as they wish and where they wish":—"Hoc superadditur igni corporeo, in quantum est instrumentum divinae justitiae vindicativae, quod sic *detinet* spiritum, et ita efficitur ei poenalis, *retardans* eum ab executione propriae voluntatis, ne scil. possit operari ubi vult et secundum quod vult."

2. To this it is objected by Suarez² that, unless by acting on the condemned spirit, fire cannot *detain* it any more than torment it in other ways:—"Ut pars illa versimilior fiat, dicendum est ignem . . . *effective* demones sibi *alligare*, et intra se continere; quod tamen alii doctores non explicant, nec videntur consequenter loquendo posse id affirmare; quia impossibile est ignem *effective* spiritum intra se detinere, nisi aliquid efficiendo in ipso; at juxta sententiam illam ignis nihil potest agere in spiritum, nec ad hoc elevari ut instrumentum Dei."

Now, it would seem to me that what St. Thomas denies is *effective alteration* and *kindred changes* of spirits by material agents; changes, that is, amounting to something like corruption, and supposing extension in the subject in which they occur. The holy Doctor seems to admit on the part of the fire an *effective restraint* of the local movements of the spirits, confining them within definite spaces, and thus rendering them incapable of free activity. There is no

¹ 4 Dist. 44, q. 3, a. 3. q1a 3.

² L. c. cap. 14, n. 8.

reason why he should not extend this principle, so as to allow that matter might be made to change as well as to conserve the location of a spirit,—provided the change be supposed to affect the spiritual substance as a whole, and not be confined to a part, which would suppose extension in the spiritual subject.

As a matter of fact, St. Thomas always supposes that the angels can move bodies locally. Now, looking at the matter from the point of view of intrinsic possibility, it does not seem to be more difficult for a body to move a spirit, than it is for a spirit to move a body. Resistance on the part of the spiritual substance would be required in either case ; and the only difficulty is to explain how a spirit may resist a piece of matter.

If, however, the nature of resistance be such as that it may be given to pure space, according to the explanation in the text ; there is no reason why it should not be given to spiritual substances contained within spaces *definitive*,—as an angel may be contained by space. Spirits may be endowed with resistance so as to enable them to move matter ; how else could they move it, as when the angel took the prophet by the hair and carried him to Babylon ? They are not made impenetrable by nature so as to be able to *receive* motions from material things. But, if God wants to use matter for the purpose either of restraining the motions of spirits without communicating any motion to them, or even for the purpose of moving them from place to place, I do not see why He should not be able to do so, provided He were to make the spiritual substance impenetrable to the material. And if resistance be merely a negation of activity, if it be a moral rather than a physical reality, so as to be communicable to pure spaces as well as to bodies ; there is no reason why a spirit should not be made as impenetrable as either, so as to receive motion from a moving body, or to communicate movement from within itself.

As for the difficulty raised by Suarez, I do not believe St. Thomas ever would admit that fire cannot act on spirit,—

not even as an instrument in the hands of God. It cannot act so as to corrupt a spirit, inasmuch as spirit is incorruptible ; but where does the holy Doctor say that matter cannot, even by divine power, be made *to act on* spiritual substances ?

II.—RESISTANCE OFFERED TO MATTER BY PURE SPACE.

It is not my purpose to inquire whether the material universe is finite or infinite in its dimensions of length, breadth, and thickness. Catholic writers say it is limited,—that it is bounded on all sides by pure space : there might be difference of opinion as to whether this can be proved from reason alone.

Taking it for granted, then, that the material universe is not extended *ad infinitum* in all directions, and supposing also that it is constantly vibrating in the direction of its space boundaries, the question arises : What is to keep it from passing beyond the limits with every vibration ; with the result that the universe of matter instead of tending to gravitate towards a centre, would have a tendency rather to dissolve in a mist ? In other words, it is supposed in the text that the ether-ocean is being pressed in at all points from outside. How can it continue to be pressed, unless there be something outside the boundaries, which offers a resistance to the movement of the ether, and from which the ether already set in motion must rebound ?

If the nature of resistance be such as it is represented in the text, this difficulty disappears. For, pure space may offer resistance to the movements of matter ; may even offer a resistance which is not absolute, but relative ; such as would yield more or less in proportion to the amount of pressure exerted. When, accordingly, a wave of the ether-ocean breaks on the shore, beyond which is pure space, I conceive that the Creator and constant Conservator of the ether and of its motion, is bound to turn back the wave through the body of the ocean, just as if it had broken on a mass of matter more or less continuous and impenetrable. Resistance or impenetrability not being a

physical but only a moral reality, may subsist quite as easily in pure space as in matter. It is thus, as a matter of fact, that it subsists in the Blessed Eucharist ; the only difference between this case and that of the ether boundaries being, that in the latter case impenetrability would be natural or due to the pure space ; whereas in the Eucharist it is preternatural, or at most connatural to a preternatural state already produced.

The reader is referred to Suarez' Metaphysics (D. 18, s. 8, n. 15), where he will find the Jesuit philosopher teaching that pure space may be endowed with resistance, "*Exemplum est in sole illuminante, cujus actio impeditur interposito in fenestro corpore opaco, quod est incapax lucis, et non resistit illuminationi sui positive, sed negative per incapacitatem ; quomodo etiam vacuum dici potest resistere, quamvis ex diversis principiis ; ergo virtus illuminativa solis non occupatur quasi conando et agendo circa illud corpus, sed solum non agit in illud, sicut etiam non agit in vacuum ; ergo illud corpus non aliter impedit transitum (ut ita dicam) illius actionis, quam interrompendo continuitatem, et quasi lineam seu radium ejus ; ergo aequale impedimentum orietur ex vacuo interposito.*"

CHAPTER XI.

ATTRACTION.

THE subject treated of in the last Chapter, Resistance, is so often associated in physical science with what is called Attraction, that whoever speculates on the nature of either, is sure to be frequently reminded of its fellow ; and to be forced to ask himself whether the theory which seems to afford the best explanation of one of the two classes of phenomena, may not be found to fail when applied to the other. Accordingly, I propose to inquire in this Chapter how far the phenomena of attraction may be explained in accordance with kinetic principles.

I

Possibly it may be well at the outset, in the interest especially of those who dabble a little in physical science, to observe that the phenomena of attraction are most difficult of explanation, no matter what theory one may be inclined to hold with regard to the general question,—the nature of activity. Take the dynamic theory, as it is usually understood, and see whether it offers any satisfactory explanation of the way in which gravitation operates, or in which iron is attracted by a magnet.

We are told that a reality called “force” emanates from the attracting agent, the sun or the magnet ; that this force reaches in some way to the thing which is attracted, the earth or the piece of iron ; that, having reached so far, the “force” returns, bearing with it the object for which it had set out. We are assured that this emanation of “force” is mutual ; that the earth attracts the sun, and the iron pulls the magnet to it, with

a force proportionate to the quantity of matter in each of these agents. There is thus a mutual interaction kept up; and when you bear in mind that these emanations take place in all directions, with the result that their intensity at various points varies inversely as the square of the distance of these points from the central force, you have the principles from which may be gathered all that any reasonable man could desire to know, about gravitation, magnetism, chemical affinity, cohesion, or any other form of attraction whatsoever. So we are assured by the ordinary writers on these subjects.

Now, there are some things which I am anxious to know, and which I really cannot deduce from the principles laid down in the preceding paragraph.

1. In the first place, since "force" is an accident and not a substance, one would like to know how it passes between bodies that are distant one from another; whether the distance be short, as in the case of the ordinary measurable magnetic attractions; or a distance of millions of miles, as in the case of gravitation. There must be a substantial medium of some kind to support the force throughout its passage, as light and heat are conceived to be supported in the luminiferous ether. If so, how many media are there? Is the luminiferous ether alone sufficient for the purpose? And in any case, at what rate of speed and in what form does the "force" of gravitation traverse the medium?

2. Moreover, whenever I reflect on the matter, I cannot help giving way to a desire of learning how it is that, when this force happens to come across an object that suits it, it returns or endeavours to return with its prey to the centre from which it emanated. Throw a stone, and it will go on for ever and ever, unless hurled back by a force superior to that which was used in throwing it. Light and heat travel somewhat

similarly ; moreover they do not bring back with them the objects which they heat or illuminate. Why is it that the force of attraction alone returns to its source? And how does it manage to bring back its object with it?

In this connection I may be permitted to quote from Mr. Stallo's book, *The Concepts of Modern Physics*,¹ the following extract from a lecture by Professor Lodge :—

“ If a man explained the action of a horse on a cart by saying that there was an attraction between them, varying as some high direct power of the distance, he would not be saying other than the truth—the facts may be so expressed ; but he would be felt to be giving a wretchedly lame explanation, and anyone who simply pointed out the traces, would be going much more to the roots of the matter. Similarly with the attraction of a magnet for another magnetic pole. To say there is an attraction as the inverse cube of the distance between them, is true, but it is not the whole truth ; and we should be obliged to anyone who will point out the traces, for traces we feel sure there are . . . A pull resolves itself into a push ; to pull a thing towards you, you have to put your finger behind it, and push ; a horse is said to pull a cart, but he is really pushing at the collar ; an engine pushes a truck by means of a hook and eye, and so on. There is still the further very important question as to why the parts hang together, and why, when you push one part, the rest follows. Cohesion is a very striking fact, and an explanation of it is very much to be desired.”

One can understand how an agent may attract an object by causing vibrations behind it, in some substance in which the object is for the time immersed, and so pushing it in towards the centre of apparent attraction. The process is familiar to every lad who throws stones into a pond to bring to shore a toy boat which has passed out of his reach. He takes care to throw the

¹ P. xxii.

stones *beyond* the boat, and would think it silly to strike the water at the side at which he himself is standing. And so, if the sun and the earth be both immersed in an ocean of ether, and if each gives out a force which gets behind the other and pushes it on, one can understand how a mutual attraction would result. But how do these forces get behind and not act before? And, though it is possible to conceive a reflection, as it were, of waves from the shores of the universe of ether; yet it remains to be explained why the forward motion from earth and sun should not be much more powerful than the backward, and thus tend to separate these bodies rather than to bring them together.

3. Nay, even though all these points were cleared up to the satisfaction of the most inquisitive, it would remain still to be asked why it is that the bodies from which these "forces," of gravitation, or magnetism, or other attractions, emanate, are not living things; and how their emanations differ from vital activities. We have been accustomed to hear life defined as a principle of self-movement, and vital action as one which arises spontaneously within such a principle, and is not received from any external created agent.¹ When a magnet attracts iron, or when the sun restrains the earth from flying off at a tangent to its orbit, each gives out a "force" from within itself, according to the dynamic theory,—a force which is produced spontaneously within its principle in either case, and is not received from any other creature. Why are sun and magnet not living agents?

It is said, I know, that in the case of gravitation and magnetism, there is a mutual interaction between agent and object; that the iron pulls the magnet, and the

¹ See *infra*, Chap. xv.

earth the sun, with a force equal to that by which iron or earth is attracted in turn ; and that, consequently, in neither case is the action quite spontaneous, but produced by an external created agent. See, however, what this leads to. The sun attracts the earth only because the attractive action is excited within the solar mass by a counter-action from the planet. But how is this counter-action itself excited? Does it exist before the sun's action commences? Do both agents commence to act simultaneously ; or does the activity of one precede that of the other? In the first case, is not the action of each spontaneous and therefore vital? And if one of the two is first to commence operations, does its movement, at least, not arise within the principle itself, without being caused by any other creature ; and is not the principle, in consequence, a living being?

These are some of the matters one would like to see explained in accordance with dynamic or any other principles.

II.

Accordingly, almost everyone who, since the dawn of the new era of science in the days of Copernicus, has given any thought to the solution of this problem, has looked on gravitation and all similar attractions as so many pushes from behind, however their origin is to be explained. Attraction, thus, is but a form of repulsion ; which, as was explained in the last Chapter, is explicable in accordance with kinetic principles by the communication of movement from a body in motion to another lying in its path, both substances being supposed to be endowed with resistance.

Taking gravitation as the most characteristic form of attraction, we find that all attempts hitherto made to give

a reasonable explanation of the agencies by which its phenomena are produced, are based on the supposition of a medium of some kind, the movements of which cause gravitation, somewhat as heat-effects are produced by motions of the luminiferous ether.

In his *Principia* Newton considered merely phenomena, and set himself to study the laws by which they are regulated, without hampering his work with any metaphysical speculations as to the nature of the forces by which the effects are produced. The force which urges bodies to approach one another was to him a purely mathematical concept, as he expressly states in his opening definitions; and at the close he repeats: "the reason of these properties of gravity I have not as yet been able to deduce; and I frame no hypothesis."¹

Nevertheless, he saw very clearly that one thing, at least, was necessary to enable bodies at a distance to act on one another;—there must be a medium through which their action may be communicated.

"That gravity should be innate, inherent, and essential to matter, so that one body may act upon another at a distance, through a vacuum, without the mediation of anything else by and through which their action may be conveyed from one to another, is to me so great an absurdity, that I believe no man who has in philosophical matters a competent faculty of thinking, can ever fall into it."²

And in the later edition of his *Opticks*, after proposing a Query as to the possibility of deducing some of the properties of light from the undulations of an all-pervading ether, he adds:—

"Is not this medium much rarer within the dense bodies of the sun, stars, planets, and comets, than in the empty celestial spaces between them? And in passing from them to great distances, doth it not grow denser and denser

¹ *Schol. Gen.*

² Third Letter to Bentley.

perpetually, and thereby cause the gravity of those great bodies towards one another, and of their parts towards the bodies ; every body endeavouring to go from the denser parts of the medium towards the rarer ? ”¹

Here we have a medium which may serve to convey the activity of gravitation ; but what is that activity in itself ? Granted that the ether “ grows denser and denser perpetually, as it passes from the heavenly bodies to greater distances,” why should it cause the gravity of these bodies ? And why should they “ endeavour to go from the denser parts of the medium towards the rarer ” ? For, the heavenly bodies are not living beings with vital appetities ; and even though they were, how could the density of the ether make them move into the rarer spaces, unless that medium pushed them on before it ? This, however, supposes the ether itself to be in motion already ; and thus gravitation is at once resolved into the kinetic form of activity.

Accordingly, since Newton’s time men of science have assumed as a basis of speculation, that it is by communicating in some way its own motions to the bodies immersed in it, that this ether medium produces the effects of gravitation ; and practically the only question has been as to the precise way in which this communication of motion is actually effected. All the theories proposed may be reduced to two.²

The first is known as the impact theory, which was propounded by Le Sage, according to whom

“ Space is constantly traversed by streams of infinitely small bodies, moving with an almost infinite velocity, and coming from unknown regions of the universe. These bodies

¹ See Stallo, p. 54.—Throughout this Chapter I have drawn largely on this work of Mr. Stallo’s, who, be it remembered, differs *toto coelo* from the view I am advocating.

² See Stallo, pp. 59, 63 ; Stewart and Tait, *The Unseen Universe*, p. 146.

are termed 'ultramundane corpuscles.' By reason of their minuteness they rarely if ever collide, and the greater part of them find ready passage through ordinary sensible bodies, so that all parts of these bodies—those in the interior as well as those on the surface—are equally liable to be struck by the corpuscles, the force of the impact being thus proportional, not to the surfaces, but to the masses of the bodies. A single body or particle would be equally battered by these corpuscles on all sides ; but any two bodies act as mutual screens, so that each receives a less number of impacts on the side facing the other. They are, consequently, drawn towards each other. The motion of the corpuscles being rectilinear in all directions, the diminution of pressure thus resulting is inversely as the squares of the distances between the bodies affected."¹

The second or undulatory theory assumes that all space is filled with a vibrating ether, which is represented as a continuous elastic medium, perfectly fluid, and pressing proportionally to its density. This subtle fluid may be supposed to penetrate the pores of all other bodies, so that its vibrations would pass through ; not, however, without having its wave-motions retarded in the passage, in proportion to the quantity of the mass to be traversed ; somewhat as light is diminished and retarded in passing through glass.

If two bodies, such as the sun and the earth, were immersed in a vast sphere of such a vibrating substance, they would act as breakwaters, each preserving the other from being beaten on by the undulating medium at one side, while the other side would be left exposed to the full force of the vibrations. The sheltering power of the breakwater would vary directly as the mass, and inversely as the square of the distance between the immersed bodies ; and the result would be a movement of the bodies towards each other, displaying in all

¹ Stallo, p. 63.

essential respects the phenomena of gravitation ; so, however, that the apparent attraction would be in reality due to repulsion.¹

II.

1. It is not a portion of my contention that either of the foregoing theories, as hitherto propounded, is sufficient to account for all the phenomena of gravitation. No physicist pretends to do more than speculate vaguely as to what may be the ultimate explanation of these phenomena ; and metaphysicians or theologians are not called upon to adopt any definite view with regard to a question in Physics, about which the most eminent physicists confess they know next to nothing.

In all such matters the metaphysician can only take the best of the explanations offered to him by physical science, and work on with greater or less confidence, according as he is more or less sure of the data supplied by Physics. Inasmuch, however, as the physical theories hitherto propounded on this matter, with the single exception of the theory of *actio in distans*, resolve

¹ I have not referred to the vortex theory recently propounded (see Stallo, *Concepts of Modern Physics*, p. xxiii.-v.), for the reason that, however it may serve to clear up details, it throws no light on the essential principles of gravitation or other forms of attraction. To be capable of explaining these modes of motion, the vortices must themselves get into motion, just like vibrations ; and, moreover, the medium in which the vortices subsist must be endowed with resistance. How a vortex could become impenetrable, unless the substance by which it is bounded be impenetrable, it passes the wit of man to comprehend. The fundamental questions, therefore, remain : What is this resistance in the medium ? How do the vortices originate ? How are they kept in being ? And how are they transferred from place to place so as to cause pressure ? Gravitation and other forms of attraction may be due to vortices rather than to vibrations ; that is a question for physicists to decide. For the purposes of this Essay it makes very little matter into which of these forms or modes of motion gravitation and other attractions may be ultimately resolved.

themselves into the supposition that gravitation is due to a push of some kind ; and seeing that this form of activity is explicable only in accordance with the kinetic theory of activity in general; it follows that whatever is known of gravitation is not only not opposed to, but quite confirmatory of, the main principle advocated throughout this Essay. It is a question of how one body in motion makes another to move likewise. I have shown¹ how this can be done only on two conditions,—of the bodies being in contact, and of each being endowed with resistance. And since resistance is a privation of physical activity and not a physical “force,” the ultimate solution of the difficulty is to be sought in accordance with kinetic and not with dynamic principles.

2. The strongest argument against the undulatory theory, as far as I can see, is, that—

“If [the] attraction [of gravitation] is the result of the impulsion of a fluid, its action must employ a finite time in traversing the immense spaces which separate the celestial bodies ; whereas there is now no longer any reason to doubt that the action of gravity is instantaneous. If it were otherwise,—if gravity, like light, or electricity, were propagated with a measurable velocity,—there would necessarily be a composition of this velocity with the angular orbital velocities of the planets, resulting in their acceleration ; the apparent line of attraction would be directed to a point in advance of the real place of the sun, just as the sun’s apparent position is displaced in the direction of the earth’s orbital motion by the aberration of light. Such an effect, if it had any existence, would have been detected long ago.”²

Mr. Stallo goes on to argue that

“There are other features of gravitation which give rise to a presumption that it is of a nature entirely different from that of other forms of radial motion. The action of

¹ See Chap. X., ii

² Stallo, p. 60

gravity is wholly unsusceptible of interference by intervening obstacles ; or, as Jevons expresses it, 'all bodies are as it were equally transparent to it ;' its direction is in right lines between the centres of the attracting masses, and is not subject to reflection or refraction ; unlike the forces of cohesion, capillarity, chemical affinity, and electric or magnetic attraction, it is incapable of exhaustion or rather saturation, every body attracting every other body in proportion to its mass ; it is wholly independent of the nature, volume, or structure of the bodies between which it occurs, and its energy is unchangeable, incessant, and inexhaustible."¹

3. These arguments, whatever their value, may be urged with equal force against any possible theory of gravitation,—whether it be based on undulations, ultra-mundane corpuscles, or any emission of "force" such as Dynamists advocate. For, corpuscles and "forces," no less than waves, take time to travel ; they are ordinarily more or less susceptible of interference by intervening obstacles, subject to reflection and refraction, capable of exhaustion or saturation, and dependent on the nature, volume, and structure, of the bodies between which they occur. Nay, even though we were to fall back on *actio in distans*, must it not be admitted that such activity takes time to travel, is susceptible of interference, capable of exhaustion or saturation, and generally subject to all the other inconveniences which are ascribed to the theory of undulations? Not to mention the essential absurdity of the concept, which forced Newton to express his belief that "no man who has in philosophical matters a competent faculty of thinking, could ever fall into it."

It is for physicists to decide whether it be really true that gravitation takes no time to travel the immense distances known to Astronomy. I have already² explained

¹ *Ibid.*, p. 62.

² See Chap. X. ii. 2, a, c.

how, in accordance with the kinetic theory, motion would take no time to travel, if in the substance which supports it there were no pores or vacant spaces. There is not, therefore, any intrinsic absurdity in the concept of motion passing over immense distances without the least loss of time. I do not know that Dynamists can say the same of "force" as distinct from motion;—can maintain that "forces" may be emitted from substances, and transmitted to other substances across immense tracts of space, and yet lose not an instant in the passage. It seems to me that time must be lost as well as space covered in any transmission of that kind. And thus the main difficulty in connection with gravitation tells rather in favour of the kinetic theory.

It must be admitted, nevertheless, that the concept of a fluid absolutely poreless, and therefore without any real extension within itself, but varying in external shape and outline merely, somewhat as a liquid varies in external form with the shape of the mineral or sponge with which it is saturated;—this supposition is exposed to enormous difficulties. There is the difficulty of explaining how there could be vibrations of any kind in a universe of matter left thus without a vacant space within its mass. It is not easy to see, moreover, how, if a body were immersed in an ocean of such an absolutely compact and impenetrable material, it could ever be moved at the speed at which space is traversed by some of the heavenly bodies. There would even be a difficulty in making out how a mass of matter so immersed could serve as a breakwater to shelter another similar mass from the waves of the undulating medium; since these undulations would take no time to travel round the edge of the intervening obstacle.

4. Though it does not seem by any means certain that

these and other difficulties with which this supposition is surrounded, are absolutely insuperable, yet one is disposed to be very sceptical about the existence of a substance so contrary to all the analogy of the material universe, as a mass of matter absolutely without extension within itself. Hence, if it be permitted to one who is not a physicist to speculate on such a question, I should be inclined to doubt of the truth of the assertion that the action of gravitation is altogether instantaneous. This also is contrary to the analogies of the material universe, all the other actions of which, as far as they are known to us, take time to travel. It is much more difficult to test by experiment the aberration of gravity, than it is to measure that of light. The "apparent line" in both cases may be different from the real line ; but these lines are not at all so easily discernible in the one case as in the other.

As for the minor considerations with which Mr. Stallo strengthens his main argument, they do not seem to be absolutely conclusive, to say the least. For instance, how does it appear that "the action of gravity is wholly unsusceptible of interference by intervening obstacles ;" or that "it is not subject to reflection ;" or that "it is independent of the nature, volume, or structure, of the bodies between which it occurs" ? Has not the mass of a body some relation to its nature and structure ? A pith ball does not weigh so much as a globe of lead of the same diameter ; the reason being that the matter is closer, and therefore greater, in the globe of lead which, consequently, offers more resistance to the ethereal medium. There is interference and reflection in both cases ; how does it appear that there is not less in the case of the pith than in that of the lead ? And as for the incapacity of exhaustion or saturation, I do not see that a pane of glass is saturated with the undulations

of light transmitted through it ; nor that two weights, when evenly balanced in a pair of scales, have not exhausted their capacity for interfering with undulations, just as an atom of oxygen exhausts its chemical affinity when it has on either side an atom of hydrogen.

IV.

Besides gravitation, the other forms of attraction usually mentioned by physicists, are, cohesion and adhesion, capillary attraction, chemical affinity, and magnetic and electric attractions. Let us see how the kinetic theory might be expected to apply to each of these.

1. It is now recognised that adhesion and cohesion are but the same energy modified differently, according as the masses cohering or adhering are similar or dissimilar in kind. If the kinetic theory be correct, these phenomena are most probably due to pressure of the medium in which all tangible and visible matter is immersed ; the pressure being conveyed by undulations identical in all probability with those of gravitation. The same impulse, therefore, which pushes water to the earth in the form of rain, causes it while falling to cohere in the form of drops ; conserves the same globular shape while the water lies on the grass ; makes it adhere to the minerals or plants with which it comes into contact ; and combines it finally into the great masses we know under the names of seas or oceans.

Cohesion differs from gravitation and the other forms of attraction, in this, that it has no influence between masses separated by a sensible distance. This peculiarity is due, apparently, to the action of the ether lying between the two substances. When the masses are kept asunder, the undulations of this medium beat on both at

all points of their surfaces ; whereas, if the surfaces be in contact, the greater the number of points of contact, the less the extent of surface exposed to the action of the waves, and consequently the less the pressure exerted directly by the ether on the masses in the region where the contact occurs. Meanwhile, the medium beats freely on the same masses at all the other points of the surfaces ; with the result that the cohering masses are pressed together at the points of contact with a force proportionate to the extent at which the surfaces touch one another.

Something analogous occurs in the case of air-pressure. The receiver of an air-pump is pressed by the atmosphere with great force to the plate on which the receiver rests, but only on condition that the plate and the edges of the receiver are ground smooth, so as to leave no room for the outside air to enter between them. Now, gravitation is supposed to be like air-pressure ; it produces its effect on any surface in proportion as its own action in an opposite direction is excluded at the same place. The denser a mass is, the fewer pores it has, and the finer it may be ground, so as to come into contact with another mass similarly ground at as many points as possible. Conceive two pieces of matter absolutely poreless, and let them be supposed to be both ground absolutely smooth, and placed so as to touch each other over the whole of the smooth surfaces ; then, the undulations to which gravitation is due should press them together with an unopposed force, and it would require a corresponding force to separate them. Bodies are hard or soft, in proportion to the number of points at which the parts into which they may be divided, come into contact.

2. The principles thus outlined apply in their measure to capillary attractions ; and analogy would lead us to

suspect that even chemical affinities are due to impulses of the same kind, which come into play when the extension of matter has been modified by the action of heat, light, or electricity. For, it is necessary to distinguish between such impulses as are due to heat or electric currents, the immediate effect of which is merely to modify the "grain," so to speak, in which the matter acted on was previously disposed; and a distinct and subsequent impulse, which is here supposed to be the formal and immediate cause of chemical affinity. Pass an electric current through water, and the immediate effect is a rearrangement of the extension which had rendered the matter fit to receive its aqueous form. A new figure and grain is thus produced in the mass, which is thereby disposed to be pressed together into a new pattern, by the impulses of the ether-waves in which gravitation has been supposed to consist. According to this view, heat and electric action, though in themselves capable absolutely of pressing matter together, yet, in comparison to the greater force of gravitation, for the most part, if not altogether, act as disintegrating agents, to break up arrangements which had been previously effected by means of gravitation, and to render matter capable of receiving new substantial forms under the influence of some similar more powerful external agent.

3. Magnetic attraction itself may thus be immediately due not to the pressure of any undulations produced immediately by the magnetic centre of disturbance, but to waves which existed previously in the ether-ocean, and which, owing to the disintegrating action of the impulse of the magnet, may be free to press in a new direction on the mass of matter affected. If this be so, the immediate effect of magnetism and electricity would be, as in the case of heat, an impulsion tending to separate the parts into which matter may be divided, and to rearrange the

shape of the extension of the mass, rather than to press the parts together. A magnet acting on a piece of metal would thus give the metal a new set,—polarization is the technical term,—exposing it to be acted on in a new fashion by the undulations of the ether-ocean ; somewhat as gases are pressed by gravitation first into the liquid and then into the solid state, ever closer and closer, according as the influence of heat is more and more removed.

Further, since heat is due to the collision of masses of matter moving under the influence of some activity prior to that which we know as heat ; and since not only light but magnetism and electricity are, in all probability, but modifications of the heat movement ; we get a glimpse of the original energy of which all the forms of mechanical activity known to science are but modifications. When once the original ether medium was set in motion, it necessarily followed that bodies immersed in it should gravitate towards one another. Gravitation as necessarily produced heat, light, magnetic and electric currents. These again reacted on the matter which they affected, giving it a new form and set, breaking up old combinations and positions, and exposing matter to be acted on by the ever-vibrating ether, and pressed together by its undulations in ever-varying forms.

V.

Lest the reader should shrink from these speculations as altogether novel, I will submit an extract from an article on Matter, contributed by Professor P. G. Tait to the new edition of *Chambers's Encyclopædia* :—

“ Next in order of simplicity to inertia, which is a property of every single particle, come the properties in virtue of which any system of two bodies, even if they be mere particles,

possesses energy depending directly on the mass of each, and also on their distance from one another. This part of the energy of a system gives rise to Gravitation, Molecular Action, and Chemical Affinity. It has been shown by Sir W. Thomson that the first of these might suffice to account for the second if not the third (at all events in aggregates of particles), provided the structure of the aggregate were sufficiently heterogeneous. Be this as it may, we know much more about gravitation than about the other phenomena referred to, and will therefore confine our further remarks to it. And yet all that we know about gravitation can be summed up in the following statement : The potential energy of a system of two particles of matter is less [more?] when they are at a finite distance apart than when they are infinitely distant from one another, by an amount which is directly as the product of their masses and inversely as their distance apart. This statement, it is to be particularly observed, contains no allusion to attraction or (so-called) force of any kind ; yet it suffices for the complete formation of the equations of motion of any system of gravitating masses, be it as complex as the solar system itself. The rest of the calculation is a matter of mathematics and of numerical data alone. Many attempts, often extremely ingenious, but all alike fruitless, have been made to explain gravitation. Such failure, however, in the eyes of a genuine scientific man is only an encouragement to perseverance ; and the very remarkable success which has attended Clerk-Maxwell's attempt to explain electric and magnetic phenomena by means of the luminiferous medium renders it at least probable that the properties of the ether will, some day, explain gravitation—probably inertia also."

It must not be supposed that these speculations are put forward here for more than their real value,—mere guesses and hypotheses very indifferently outlined. It is not pretended that, such as they are, they are altogether true ; or that the advance of science will not prove them to have been in many respects even puerile. Physics confesses that at present it knows nothing for certain of

the ultimate or even of the immediate cause of attraction. The speculations of this Chapter may be very wide of the truth ; but, as far as anyone knows at present, they are at least as likely to be correct as any that may be advanced by anyone else, physicist or metaphysician. The main principle must, as I imagine, turn out true in any event, however the details may have to be modified.

What is the good, it may be asked, of referring at all to a question involved in so much obscurity? My answer is, that attraction, like repulsion, is a great fact of nature. To explain this fact, two theories have been proposed. Some say attraction is explicable only on the supposition of the emanation of "force" from matter. Others contend that "force," as distinct from motion, is a figment ; that motion in matter is sufficient to account for the phenomena of attraction as well as for those of repulsion. In support of the latter theory it might be enough to show that, even though there were such a reality as "force," it could not attract except by pushing,—that is, except in accordance with kinetic principles. But it would be manifestly much more satisfactory if we could explain in detail how exactly these impulses are communicated. At present this is impossible ; we cannot work out a detailed solution ; we can only grope and speculate, knowing well that the hypotheses we form are in many respects very different from the reality. Yet are we confident that through them all there run some true principles :—that matter is ever active ; that it cannot act at a distance ; that it acts by impulsions of some kind ; that these impulsions are motions communicated between masses in contact ; and that, most probably, all the energies of matter are but modifications of some one, or at most some few, primordial activities.

Whatever theory of activity one adopts, one must be content with speculations and hypotheses when one endeavours to solve the problems presented by the phenomena of attraction. Dynamists have to speculate and frame hypotheses no less than the advocates of the kinetic theory ; nay even more, for they usually combine the hypotheses of the two systems. Till they have arrived at what we may reasonably regard as certain, let them not blame others for testing a different theory of activity, by applying it to explain these most obscure phenomena of nature.

NOTES TO CHAPTER XI.

I.

THE ANCIENT PHYSICISTS ON ATTRACTION.

From the earliest times, apparently, attraction, and especially the form of it known as gravitation, has proved a puzzle to philosophers. Suarez in his *Metaphysics* (Disp. 18, Sec. 7, nn. 21, &c.,) gives a resumé of the opinions that prevailed among the followers of Aristotle up to his time : the following extracts may not be without some interest for the reader.

“ Many say absolutely that heavy and light bodies are moved into their places by themselves,” n. 21.

This view is ascribed to Scotus and others ; it manifestly leads to an identification of vital and mechanical activity. For, living things are those which move themselves. Hence, if bodies endowed with gravity were to move of themselves into their places, it should be said either that they are truly alive, or that the characteristic of vital activity is some property of motion other than its spontaneity. Hence we read :—

“ Others are of opinion that these [light and heavy] bodies are merely passive ; and that they are moved either by the heaven, or by being attracted by their natural locations, or by a medium, or by some unnatural location which expels them :” “ Alii existimant haec corpora [gravia et levia]

mere passive se habere ; moveri autem vel a coelo, vel attracta a suis locis naturalibus, vel a medio, seu a loco contrario expellente." (*Ibid.*)

I would ask the reader to mark two things in connection with this second class of opinions. In the first place, there is the half truth that under the action of gravitation bodies are passive ; they are represented as *merely* passive, and in that there is an admixture of error. In the next place, remark the agent which is represented as acting on them : "the heavens or some medium," which, curiously, seems to be identified with a place which expels them. These are not so very unlike the theories developed by the moderns, after Newton had called attention to the possibility of an ethereal medium. Suarez continues :—

"It is the common opinion that they are moved principally by the generating agent. This is the teaching of Aristotle, . . and the Commentator [Averroes] is of the same mind, . . although at times he seems to think differently. St. Thomas holds the same, . . and Cajetan, Ferrariensis, Capreolus, &c. And this is the true view, when it is rightly explained ; yet many even of the Thomists err greatly in explaining it." "Communis sententia est moveri principaliter a generante. Sumitur ex Aristotele, . . et idem sentit Commentator, . . quamvis interdum varius esse videatur. Idem tenet D. Thomas, . . Cajetanus, Ferrariensis, Capreolus, &c. Et haec sententia recte explicata vera est ; multi tamen etiam Thomistae in ea explicanda valde errant." (*Ibid.*)

The common opinion, therefore, among the Schoolmen was, that the motion of gravitation is due to the generator. But is it produced in every case immediately by the generator, and by it alone ? This question seems to have caused division in the ranks of the followers of the Philosopher ; the Thomists, in the opinion of Suarez, erring greatly in their interpretation. Let us hear what they say :—

"For, some think this motion is from the generator in such manner as that *there would be in the moving object itself no intrinsic virtue productive of the motion*, but only a natural

passive potentiality, by reason of which such motion is due to it. . . Others distinguish : for, when a heavy body (they say) begins to move downwards immediately after its production, then it is moved immediately by the generator. . . But when it is moved [only] some time after its production, then they say it is moved, not by the generator, but by its own activity. So thinks Soncinas, who ascribes the teaching to the Commentator ; and the same is held by Cajetan of Thienna and Paul of Venice." "Quidam enim ita existimant hanc motionem esse a generante, ut in ipso mobili nulla sit intrinseca virtus activa motus, sed solum naturalis potentia passiva, ratione cujus illi debetur talis motus . . Alii vero distinctione utuntur ; nam quando grave (inquiunt) immediate postquam genitum est, incipit moveri deorsum, tunc immediate movetur a generante, ipso passive tantum se habente. . . At vero quando grave movetur aliquo tempore transacto post generationem, tunc aiunt non moveri a generante sed a se active. Ita Soncinas, . . et tribuit Commentatori ; et idem sequuntur Cajetanus Thiennensis et Paulus Venetus." (*Ibid.*)

Observe the very remarkable opinion ascribed apparently to the great body of the Thomists,—“multis ex Thomistis,”—that in moving downwards heavy bodies exercise no intrinsic and active power, but only a passive capacity for the reception of motion. Of course, they found it difficult to explain how the generator of the substance could communicate this motion, when the substance generated passed out of contact. They seem to have forgotten or neglected the medium of the ancients ; and hence they had to compromise with the Dynamists of the time, and admit an intrinsically active principle. This, however, they did not admit except for the motions communicated after the product had passed out of touch with the agent which produced it.

For his own part Suarez teaches that “as often as an inanimate object tends to its natural place, its intrinsic heaviness or lightness is the proximate, but not the principal, efficient cause of its motion.” “Quotiescunque res inanimata tendit in locum suum naturalem, intrinsecam gravitatem vel

levitatem esse principium efficiens proximum, non vero principale illius motus" (n. 23). This view he ascribes "without doubt" to Aristotle; although he has to admit that the Philosopher often asserts that heaviness and lightness are not efficient principles of activity. Suarez might have found the explanation in the identification of motion and force in the philosophy of Aristotle; so that gravity would be, and at the same time in a true sense would not be, an active principle of motion. It would be active, inasmuch as it is a quality capable of having, holding, and exerting the impulse which in the first instant it received from another agent. It would not be active, inasmuch as it needs in the first instant to receive this impulse or motion.

The Thomists, whom Suarez undertakes to refute, were well aware of this distinction; I should be very much surprised to find them teach the opinion ascribed to them by the Jesuit writer, that in its downward motion a heavy body is *merely* passive, and not active under a different aspect. They derived from Aristotle the axiom that "*actio et passio sunt idem motus*:" this portion of their system Suarez seems never to have realized.

It remained for him to offer some explanation of how a body moving downwards under the influence of gravity, which he represents as a quality which gives out "force" from within itself,—how such a body is not a living being. The reason is, he says, because it is not the principal but only the instrumental cause of the motion; the principal cause being the agent that generated the substance and gave it the right to its proper place, somewhere downward. As long as it is prevented from resting in this place, it has a right to be moved in the direction of its right, by the agent that generated it and gave it the right to that location. Hence, the motion downward is not its own so much as the generating agent's (nn. 26, 27).

We are not so much concerned with the physics of this passage; which, however strange it may seem, must be admitted by the moderns to be almost, if not quite, as good

as anything they can supply with regard to the same question. Ask yourself, however : Is the motion of gravitation due to an action of the gravitating body, or is it not ? If not, the body exerts no force, and there is no mutual attraction. If it is due, then, when a heavy body moves downward, it really acts, and by a "force" emanating from within itself. Is not such motion vital ? Is not an act truly vital, even though the immediate principle of activity may be the instrument of another, provided its action or "force"—whatever you wish to call it—does not come to it from any other created agent ? Do not men, beasts, and all other living creatures, perform all their actions, vital as well as mechanical, as instruments of a Higher Power ? Hence, if Suarez' explanation were admitted, we should have to define vital action after a manner hitherto unheard of in Catholic Philosophy.

As to the teaching of Aristotle, with regard to the immediate cause of gravitation, it will be found in its most formal shape, perhaps, in the Eighth Book of the Physics (cap. 4 ; compare *De Coelo*, Lib. 4, c. 2) ; the passage may be studied with profit under the light of St. Thomas's commentary. Needless to say, the teaching of both masters is blotched by errors in Physics and Chemistry ; nevertheless, it is quite plain from the concluding sentence of each, that they regarded gravitation as the result of a push from behind. When a column is removed, the structure which it supports falls to the ground, precisely as a ball rebounds from a wall, not by any "force" exerted by the obstacle, but by the energy of the agent which gave it its first impulse. So, "*none of these heavy or light bodies move themselves, though each has a principle of motion ; that is, not of moving, nor of doing, but of being moved [by an external agent].*"¹

¹Ο δὲ το ὑφιστάμενον καὶ κωλύον κινήσας ἔστι μὲν ὡς κινεῖ, ἔστι δ' ὡς οὐ, διον ὁ τὸν κίονα ὑποσπάσας ἢ ὁ τὸν λίθον ἀφελὼν ἀπο τοῦ ἀσκού ἐν τῇ ὕδατι. κατὰ συμβεβηκὸς γὰρ κινεῖ, ὥσπερ καὶ ἡ ἀνακλασθεῖσα σφαῖρα οὐχ ὑπὸ τοῦ τοίχου ἐκινήθη, ἀλλ' ὑπὸ τὸν βάλλοντος. "Οτι μὲν τοίνυν οὐδὲν τούτων αὐτὸ κινεῖ ἑαυτό, δηλον. Ἀλλὰ κινήσεως ἀρχὴν ἔχει, οὐ τὸν κινεῖν οὐδὲ τοῦ ποιεῖν ἀλλὰ τοῦ πάσχειν. Phys. Lib. 8, cap. 4, *ad fin.*, Lect. 8 ; compare *De Coelo et Mundo*, Lib. iv. cap. 1, 2 ; *Meteor*, L. i., cap. 3.

So writes the Philosopher ; and the Angelic Doctor comments on his words as follows :—

“ He concludes, therefore, that *it is manifest* from what he had said, that *neither of these, viz., heavy or light bodies, move themselves* ; and yet their movement is natural, inasmuch as *they have in themselves a principle of motion* ; not, indeed, *moving and active principle, but one which is passive, and in potentiality to such an action.* From which *it is manifestly contrary to the mind of the Philosopher [to say] that there is in matter an active principle of motion*, as some say is necessary that its movement may be natural ; inasmuch as *for that effect a passive principle is sufficient.*” “ Concludit manifestum esse ex dictis, quod nihil horum, scil. gravium et levium, movet seipsum. Sed tamen motus eorum est naturalis, quia habent principium motus in seipsis ; non quidem principium motivum aut activum, sed principium passivum, quod est potentia ad talem actum. Ex quo patet contra intentionem philosophi esse, quod in materia sit principium activum, quod quidam dicunt esse necessarium ad hoc quod motus sit naturalis ; sufficit enim ad hoc passivum principium, quod est potentia naturalis ad actum.” In loc. Lect. 8, in fin.

How does it fit in with the dynamical theory of gravitation to say that the motion downwards of a falling body is not due to an active but only to a passive principle within the falling body ? No more than it fits in with the same theory to say that a ball is reflected from a wall altogether by the energy which it got from the thrower, and not in the least by any “force” of the resisting obstacle. It must be admitted nevertheless that neither St. Thomas nor Aristotle is very clear as to the external agent from which falling bodies derive their motion. They undoubtedly teach that all movement comes ultimately from God ; and they often say that “the heavens” act as intermediate agents. May it not be that the heavens were to the mind of the Philosopher a medium of some kind not altogether unlike the Newtonian ether ?

In this connection the derivation assigned by Aristotle for the word “ether” is not without its significance. He

ascribes the origin of the term to ἀεὶ θέν, to be always in motion, rejecting the derivation from αἶθεν, to burn (St. Thomas on *De Coelo et Mundo*, L. i., c. 3; *Meteor*, L. i., c. 3), assigned by Anaxagoras. According to the Philosopher, the ether extended without interruption from the utmost bounds of the starry heavens to the fringe of the atmosphere which surrounds the earth. It is the medium of communication between the heavenly spheres and the earth which is under their influence. And inasmuch as all the heavenly bodies are formed of this ethereal substance, it and its motions may be well said to be, in the system of Aristotle, after the Prime Mover, the great store-house of all the mechanical energy of the universe.

In the *Summa Contra Gentiles* (l. 3, c. 82, 7) there is a very important passage in which St. Thomas reveals his mind as to the ultimate principle to which gravitation is due. Its immediate cause is the generator of the gravitating substance or quality; but it is ultimately due to the action of the heavens, which is the same as the action of the ether. "Est ergo corpus coeleste causa omnis alterationis in his quae alterantur. Alteratio autem in his inferioribus est principium omnis motus; nam per alterationem pervenitur ad augmentum et generationem; generans autem est motor per se *in motu locali gravium et levium*. Oportet ergo quod coelum sit causa omnis motus in istis inferioribus corporibus."

II

THE DENSITY OF ETHER.

Physicists find it difficult to explain how it is that the ether offers so little resistance to the movements of bodies, whereas it is capable of transmitting undulations with the rapidity of light,—nay with the still greater rapidity with which gravitation travels. If I do not mistake, the tendency is to solve the difficulty by representing the ether as an extremely attenuated substance. See, *e.g.*, the Article on "Ether" in

T

Chambers's Encyclopedia. But, then, the question arises as to how the mass—not the molecules—of a substance so attenuated can have the elasticity and hardness which motions so rapid as those of light and gravitation postulate in the substance in which they are sustained.

It is said, I know, that an attenuated ether-substance might have very great rigidity: how could it, unless it was pressed from without by another medium? And with regard to this the same difficulty would arise.

As I conceive it, the ether is not a greatly attenuated, but rather a very dense substance, with at most very little pores or empty spaces. (See Professor Lodge, quoted by Stallo, *Concepts of Mod. Physic*, p. xxiv.) Nevertheless, it offers but small resistance to the motions of bodies, owing to the rapidity with which the ethereal medium flows back into the spaces left vacant by these bodies in their passage. If the water through which a ship moves, could close in behind the ship almost indefinitely more rapidly than she passes through the ocean, it would press on her stern almost with as much force as on the bows; and thus very little energy would suffice to move the heaviest vessel at a great speed. The force required represents the difference between the pressure on the bows and on the stern; and of course, the more the latter pressure is increased, the less force will be required.

Now, the ether is pressed in both before and behind a body moving within it, by the motion which produces gravitation; and this motion is almost inconceivably more rapid than that of the most rapidly moving of the heavenly bodies. Accordingly, the difference between the pressure before and behind the body which moves in the ethereal medium, is comparatively slight. There is, however, always some difference, and therefore some resistance on the part of the ether; and this difference and consequent resistance increases in quantity, as the motion of the body that moves in the ether increases in rapidity.

If this principle be true, it will follow that it would be easy to move a body through the densest and hardest medium, if

one could only get the material of which the medium is composed, to close behind the body which moves through it, with almost the same force as it exercises in front. This, however, is what we cannot do, owing to the fact that we cannot control the motions of the ether-medium, to which, in the form of cohesion, the hardness of material substances is due. But it is this precisely which the ether does for itself, under the influence of gravitation, when any other body is moved through its mass. The pressure in front is thus counterbalanced by that which is exerted behind; and the ether-mass, for all its density, offers but little resistance to the motion of the foreign body.

It may be well to remark that of late the tendency, among those physicists especially who favour the vortex-theory of gravitation, cohesion, and other attractions, is, to regard the medium in which the vortex-movements arise, as "a perfectly homogeneous, incompressible, continuous body, incapable of being resolved into simple elements or atoms; it is, in fact, continuous and not molecular." So writes Professor Lodge, quoted by Stallo (p. xxiv.). I do not go near so far as that, not being able to understand how there could be either a vortex-movement or a vibration in a *perfectly* continuous mass. (See Ch. x. ii. 2, pp. 213-217.)

CHAPTER XII.

PRODUCTION OF FORMS : ACCIDENTS.

AMONG the arguments usually urged against the kinetic theory, special attention is due to one which is based on the fact that new forms are being constantly produced, as well within ourselves as in the world around us ; the contention being, that mere motion is incapable of producing forms. By motion, it is urged, a reality is transferred from place to place, without losing its individuality. After the movement, what was transferred remains precisely what it was before, its location only being changed. Experience, however, proves that changes occur not in place merely, but in figure, colour, qualities, and properties of every kind ; nay, even in substance. It is contended that for the production of these things something more is necessary than mere change of place,—something which is best represented by the “force” of the dynamic theory.

There is no denying the importance of the consideration here advanced ; nor am I in the least disposed to dispute about the facts,—being a strong advocate of these substantial and accidental changes. The question, therefore, to be considered is, not whether such entities are really produced, but rather how precisely they are brought into being.

This question presents special difficulty to one who would like to examine it under the guidance of the great masters of the School, from the fact that, owing to their mistaken notions of Physics, the statements of these Doctors have in many cases to be discounted largely. To St. Thomas and Scotus fire was a substance, and the cold of water in the ordinary condition of that liquid,

was a positive quality. They considered bodies liable to lose their heat without producing any heating effects in surrounding objects. Nay, even though a piece of matter were surrounded by pure space, they seem to have thought it would have a natural tendency to revert after a little time to some normal temperature, no matter how intensely it might have been heated. These are but samples of the physical "facts" to which in their dissertations on this question the Schoolmen are constantly referring in proof of their opinions. They are mentioned here, not with any object of indulging in a sneer at the basis of the Metaphysics prevalent three centuries ago; but rather to illustrate the difficulty of duly appraising the arguments, objections, replies, and explanations, which were then given by those who took leading parts in the controversy that prevailed about this very abstruse and intricate philosophical question.

To arrive at anything like a satisfactory solution of the difficulty against the kinetic theory proposed at the opening of the Chapter, it will be necessary to call attention to some important phases of this celebrated scholastic controversy. It shall be my endeavour, as far as possible, to deal only with one or two great primary features, without entering into obscure details or very minute subtleties. I hope to show that in their disputes as to the immediate principle of the production of forms, whether accidental or substantial, so far from relying on "force" as an entity really different from substance, faculty, and motion, the Schoolmen never even refer to such a reality. Moreover, they lay down many propositions which are utterly inconsistent with the hypothesis of its existence, and which are capable of explanation only on the supposition that it is by motions only immediately arising out of their faculties, that created agents produce these substantial and accidental

changes. In treating the question it is usual to commence with the eduction of substantial forms; I find it more convenient to reverse the order and give first place to the accidents.

I.

With regard, therefore, to the manner in which accidental changes are produced, the main question in dispute among the Schoolmen was, whether these accidental forms are caused efficiently and also immediately by the substances which underlie them; or whether it is true, rather, that substances never operate efficiently except through the medium of an accidental power or faculty. The Scotists maintained that substances operate immediately; the Thomists, on the contrary, held that faculties, not substances, are the immediate principles of activity; and that substances energize only through these faculties.

Take, as an illustration, the case of thought. It is an action, its effect being an idea, which is a kind of image or representation formed in the mind. An idea, accordingly, is one of those accidental forms which are produced within us; and the point in dispute among the Schoolmen was, how precisely this particular form is produced. St. Thomas held that the thought-actions which terminate in ideas proceed immediately from the intellect, which he represents as an habitual power of some kind really distinct from and sustained by the substance of the soul. The spiritual substance thinks its thought, but only by means of this intellect really distinct from itself. Scotus denied the reality of the distinction, maintaining that the actions which terminate in idea-forms emanate immediately from the soul itself, the intellect being nothing else than the substance of the

soul considered as the principle of such a thought-action.

So, too, in the case of colour. Under the influence of heat a bar of iron becomes red or white; these colours are some of the forms to which Dynamists refer as being produced *de novo* in the world around us, and needing the exercise of what they call "force." A Scotist would contend that the action by which redness or whiteness is produced in the iron bar, proceeds immediately from the substance of the metal. The disciples of St. Thomas maintained, that while the substance of the bar is active in producing these shades of colour, the immediate principle of activity is not the iron itself, but some quality—heat—which it supports and through which it energizes.

1. It is not necessary for my purpose to discuss the reasons for and against either of these opinions; what I am concerned with is to show how far both parties have revealed their minds as to the existence of "force" as a reality distinct from substance, faculty, and motion.

Now, it seems to me that if these great masters believed in "forces" of this kind, there could be no room at all for the controversy, and the opinion of the Scotists would have been at once rejected. For, the disciples of the Subtle Doctor did not recognise even faculties—permanent virtues or powers—as distinct from substances; yet we are asked to believe that they who repudiated permanent faculties, advocated at the same time the existence of transient virtues or powers called "forces." They held that actions proceed immediately from substances: is "force," then, a substance? Suppose a Thomist were to argue thus:—On the one hand you contend that every action must be produced by what you call a "force," and yet you maintain that it proceeds immediately from substance;—how could the Scotists defend their position?

Yet, wonderful to relate, though heaven and earth were searched by the Thomists for arguments in favour of their opinion, it never dawned on one of them that here, ready to their hands, was a weapon which no armour of their adversaries could possibly resist. Goudin, for instance, who discusses the question fully, never once refers to this principle of "force," though he insists very strongly on the existence of habitual or permanent virtues or powers. Neither do I find the argument in Suarez, nor—curiously enough—in Fr. Harper,¹ who seems to have forgotten his dynamic principles when they would have been most useful for his purpose.

2. Dynamists can offer but one explanation of the omission of all reference to "force" in connection with this famous controversy. It is, that to the minds of the disputants "force" was nothing else than action; and that, consequently, it may have been recognised by the Scotists not as a *principle* of activity but as *action* itself; of which, as they contended, the immediate principle is substance and not a quality of any kind. According to this explanation, the difference between the two great scholastic parties would be, that whereas the Thomists believed in accidental powers both permanent and transitory, their adversaries would deny that there are any permanent faculties, but would admit transitory realities of some kind, which are properly called actions, but to which the name "force" is applied also.

In support of this view it might be urged that Suarez, who in this celebrated controversy sides partly with the Scotists, expressly states that where he believes substance to be the immediate cause of accidents, he represents it

¹ The question is discussed by Suarez in the *Metaphysics*, Disp. 18. Cf. Harper's *Metaphysics of the School*, Vol. iii; Goudin, *Phys.* Pars. i., Disp. Q. 4.

as operating by giving out an action, which he even goes so far as to call a "force." "Since the substantial form exists as a first act and the accidental as a second, it is probable that the substantial form has some force, so that the accidents proper to it may emanate from it."¹ Here we have express mention of "force," which is identified with action.

In reply I would ask you in the first place to pay particular attention to the qualification in the extract, "it is probable." It was only probable, therefore, to Suarez, that there is a "force" given out by substances when they produce accidental forms immediately. Does any modern Dynamist consider it only probable that agents cannot act except by means of "forces"? If so, he will allow others the liberty of holding a different opinion.

To come, however, to the point. I admit at once that in the opinion of Suarez there is some kind of force or action between the substance and the forms which he represents as emanating from it immediately,—between, say, the substance of the soul and its faculties of intellect and will. The same may be the teaching of the Scotists; though I doubt very much whether between the substance and its effect they place any action which is really distinct from both. However, let it be granted that they do; so that they would extend to the production of all accidents what Suarez holds only with regard to some; and consequently that substances produce forms immediately by giving out an action which is also a force;—let all this be granted, and the question still remains: is this force, which consists altogether in action, the same

¹ "Cum forma substantialis sit ut actus primus, accidentalis vero ut secundus, probabile est habere formam substantialem aliquam vim ut ab ea manent accidentia sibi propria." *Metaph.* D. 18, S. 3, n. 4.

as the "force" insisted on by those who advocate the dynamic theory?

No one denies the existence of force in some sense : I maintain that in motion there is force sufficient to produce effects. Dynamists are not content with force in my sense ; I would like to know whether they would be satisfied with a force in the sense in which it is thus advocated by Suarez. In one word, is this "force" of theirs an *action*, or is it a *principle* of activity really distinct from its action, as any other principle is from what it originates?

Certainly Suarez and the Scotists did not recognise any principle of activity other than substance, in those cases in which, as they contended, substances are the immediate agents by which accidental forms are produced. Any force they recognised was a pure action ; what kind of entity that is Suarez takes care to explain :—

"This natural resultance [effluence of faculties from substance] is not without some action. For, what resultance adds to the entity of an inherent accidental form, is merely a certain mode of intrinsic dependence of the property on its form as on its active principle ; *dependence, however, on an active principle and action are the same thing.*"¹

Accordingly, the force which Suarez recognises as acting when substances produce their accidents immediately, and which he calls action, is merely "a certain mode of intrinsic dependence of a property or faculty from its principle or root." Are modern Dynamists satisfied with a force of that kind? If so, I do not see any great objection to their theory ; but I should like to be told

¹ "Confirmatur quod supra diximus, nempe, hanc naturalem resultantiam non esse sine aliqua actione. Nam id quod addit resultantia supra entitatem formae accidentis inhaerentis, solum est quidam modus dependentiae intrinsicae proprietatis a sua forma ut a principio activo ; dependentia autem a principio agente et actio idem sunt." L. c. n. 13.

definitely what precisely this "mode of dependence" is. Is it anything very different from motion? Is not motion far more than a mere mode of dependence,—a mode of dependence of a very definite character?

I submit, then, that Suarez and the Scotists maintain that there is true efficient causality where they would not recognise any "force" in the sense of the Dynamists. But if *some* forms—those which arise by resultance—may be produced efficiently without any exercise of "force," what becomes of the objection to the kinetic theory which I proposed at the beginning of the chapter, to the effect that motion alone, without "force," is incapable of producing accidental changes?

II.

Let us turn now to St. Thomas, and see whether he, at least, maintained that substances are incapable of producing accidental forms, unless through the agency of what is known as "force."

1. The Angelic Doctor divides accidental forms into two classes, according to the manner in which they are produced: some arising by transmutation, others by what he calls "natural resultance." "The emanation of properties from their subjects," he writes,¹ "is not by means of transmutation, but by a natural resultance." And again:² "a faculty of the soul flows from its essence not by transmutation but by a kind of natural resultance."

Resultance takes place in case of all accidents which,

¹ "Emanatio propriorum accidentium a subjecto non est per aliquam transmutationem, sed per aliquam naturalem resultantiam." I. q. 77, 6. ad 3.

² "Potentia animae ab essentia fluit non per transmutationem sed per naturalem quandam resultantiam." *Ibid.* a. 7, ad 1.

however they may be by nature posterior to and dependent on their subject, yet are naturally inseparable from it in point of time ; so that the substance cannot exist for a moment without them, unless by a miracle such as deprives the Body of Christ in the Eucharist of its extension and impenetrability. Other accidental forms,—as, for instance, thoughts, particular shades of colour, and such things,—without which the substance may have existed for a time, and which are infused by a gradual process of greater or less rapidity, as iron grows more and more white under the influence of heat,—these forms are said to be infused after *transmutation*.

Now, according to the Thomists, the teaching of their Angelic Master is, that substances are truly efficient causes of such accidental forms as are produced in them by transmutation, but not of those which owe their origin to mere resultance.¹ An example or two will make the doctrine clearer. The soul, they would say, is not the efficient cause of its intellect, but is of its ideas ; iron does not effect its own quantity, but it does produce the white colour to which it is raised when exposed to heat ; the substance of a locomotive is the efficient cause of its being in a *certain place* at a certain time, but not of what may be called its *location in general*, inasmuch as it could not naturally exist at all unless it were in some place or other. That this is a correct representation of the doctrine of St. Thomas, I have not the slightest doubt.

Seeing, therefore, that in cases of transmutation there is true efficient causality, whereas in cases of resultance there is no such thing, it is of the first importance to one who would understand what the Angelic Doctor requires for efficient causality, to find out what there is in trans-

¹ See Harper, Vol. iii, Prop. 252, 254 ; Goudin, *Phys. Pars* 1, D. 2, q. 4, a. 4 ; Suarez, *Metaph.* D. 18, Sec. 3.

mutation more than in mere resultance. If the reason why there is an *effect* in the one case, whereas in the other there is but a *result*, be, that in the former case there is "force" whilst in the latter there is none, then I admit that St. Thomas is, so far, against me. But if, on the contrary, in assigning the reason of this difference, neither the holy Doctor himself nor his disciples ever refer to this thing called "force," but rather to motion, which they find in transmutation but not in resultance;—if this be so, I submit that Dynamists ought to acknowledge that the exercise of "force" is not, to the mind of the Thomists, of the essence of efficient causality. Let us, therefore, inquire how the difference between these processes, transmutation and resultance, was understood by St. Thomas and his school.

2. Take resultance in the first place. It is formally defined by Goudin to be "nothing else than the production of one thing at the production of another, by reason of the natural connection between the two."¹ The nature of this connection is often expressed by saying that one is *due* to the other, as faculties are due to the soul, or extension to a piece of matter: hence the connection is said to be *due* or *natural*.

Goudin goes on to explain that "an essence may be said in a certain sense to be the efficient cause of the *properties which emanate* from it; not, indeed, in the proper sense of efficient causality,—as if the essence were to elicit an action productive of these properties;—but by a kind of reduction, inasmuch as it carries on the action of the [creative] agent to the properties."² In other

¹ "Dimanatio seu resultantia nihil aliud est quam productio unius rei ad productionem alterius ex vi naturalis connexionis quam habet cum illo." L. c.

² "Infertur secundo essentiam quodammodo posse dici causam efficientem respectu proprietatum ab ea dimanantium, non quidem proprie, quasi ipsa essentia eliciat actionem productivam talium proprietatum; sed reductive

words, the essence and its properties are produced by the one creative act,—the properties together with the essence in the order of time, but dependent and consequent on the essence in the order of nature.

This is the teaching of all the Thomists, who, however, have to explain certain expressions used by their Angelic Master. For the holy Doctor appears to assert in more places than one, that the human soul is the efficient cause of such of its properties as come to it by way of resultance. Thus, “actuality is first in the subject of an accidental form, before it is in the accidental form itself ; hence *the actuality of the accidental form is caused by the actuality* of its subject ; so that in so far as the subject is in potentiality, it is susceptible of the accidental form ; but *in so far as it is in act, it is productive of the same.*”¹ The Angelic Doctor would seem to teach here that the soul is the efficient cause of its intellect, and matter of its quantity.

Now, if St. Thomas really held that a substance cannot be an efficient cause unless in so far as it gives out a “force,” such as Dynamists would have us to understand “force” to be, could there be any question of efficient causality in either of these processes? Who ever heard

in quantum ipsa defert actionem generantis ad proprietates.” *Ibid.* Compare Harper:—“God creates the human soul in its potential integrity. His adequate created act is virtually equivalent to certain partial creative acts with their respective terms. In other words He creates by His one act the soul and each of its faculties according to the essential nature of each constituent. . . *The intellectual faculty is concreated as a faculty, essentially and immediately dependent in its character of accident on the essence of the soul as its subject.*” *Metaphysics of the School*, Vol. iii, p. 173.

¹ I should say that he is discussing the relations between the human soul and its faculties. “Actualitas per prius invenitur in subjecto formae accidentalis quam in forma accidentalī; unde actualitas formae accidentalis causatur ab actualitate subjecti; ita quod subjectum in quantum est in potentia, est susceptivum formae accidentalis, in quantum autem est in actu est ejus productivum.” I. q. 77, a. 6, c.

of quantity being produced in matter by anything like "force" antecedent to quantity? Who ever dreamt of placing a "force" between a human soul and its intellect? It seems quite plain, from the fact that there is any difficulty at all about the teaching of St. Thomas as to whether resultance and transmutation are truly active processes, that neither he nor his early disciples had the same notion of activity as that to which Dynamists would bind us at present.

3. But if you make the supposition that to the mind of the Saint action was nothing more than motion, you will easily see how a question would arise as to whether this motion is found in cases of resultance as well as in those of transmutation. For, properties such as intellect and quantity, arising by resultance from substances, are in some sense posterior to the substances to which they are due; hence they *flow* or *emanate* from their subjects in some way; and the question is how we can conceive flow or emanation except as a true *motion*, and therefore as *action* or *efficient causality*.

The explanation of this difficulty will help to make clear what was the mind of the Saint with regard to the real difference between resultance and transmutation,—between simultaneous though dependent production, and true causal efficiency.

There is no doubt whatever that the holy Doctor frequently represents forms which are produced by resultance, as *flowing* or *emanating* from their substances. Such expressions might seem at first sight to imply efficient causality, which from time immemorial has been defined as an *influx* or *flow* of something.¹ Hence we have seen how the Saint himself speaks of *essences* as

¹ "Influxus unius rei in aliam"; "principium extrinsecum ex quo fluit motus." See p. 153.

causes or as *productive* of their *properties* ;¹ and steadfast disciples, like Goudin, have taught that in resultance there is some kind of efficient causality of an imperfect character.

Nevertheless, from the very distinction drawn by St. Thomas between resultance and transmutation, it is plain that in his opinion effluence from potentiality may occur in two ways. The production of a new form may not postulate the cessation of anything that existed previously,—as faculties are given to a soul without detracting from whatever positive reality was already in the substance ; or the new form may be incompatible with some one of its antecedents, which must therefore cease to exist before the new accident can begin. Thus, a globe of wax ceases to be round in becoming angular.

The former of these processes is what St. Thomas calls resultance ; the latter is transmutation. The essential difference between the two is, that resultance is a flow from an antecedent principle which continues unchanged in itself, whereas transmutation imports a cessation of some reality that preceded the change and from which the change originated. In both cases there is something produced *de novo*,—something which is both due to and dependent on its immediate antecedent ; with this difference, however, that resulting forms depend on an antecedent which remains with them to support them, whilst in cases of transmutation the antecedent does not remain. Each link in a line of transmutations depends on its antecedent, as effects depend upon the time spent in producing them ; the effects remain, but the time must have passed. So quantity comes from the substance of matter by resultance ; but one mode of

¹ See pp. 284-6.

quantity is transmuted into another, when what was a globe takes a different shape.

Akin to this difference between transmutation and resultance in the philosophy of St. Thomas, there is another between *motion* and *flow* to which I would call special attention. The latter of these terms is wider than the former; there is flow in every motion, but there is not true motion in every flow. In resultance, as we have seen, there is flow but no motion; to move one must *pass* from an antecedent state or form. When a body gets its first location it cannot be said to *move* into it, but merely to *get* it; let the same body *pass* into another place and it will be said to *move*. Hence St. Thomas takes it for granted that transmutation and motion are the same thing, and proves the Immutability of God by the consideration that, if He were to change or move, He should give up some perfection.¹

True transmutation, therefore, and true motion are quite identical in the philosophy of St. Thomas. But, wherever there is transmutation there is efficient causality. This is an important link in my argument, and it is proved from what has been already said with regard to resultance. Why, in cases of resultance, is there no true efficient causality, unless for this reason, that true efficient causality supposes transmutation?

The disciples of St. Thomas rely on this reason alone, and I think it is quite plain that the Saint himself sees in cases of transmutation something more than resultance;—else why distinguish one from the other so carefully? The addition is true activity, as is also plain enough. Hence, transmutation, motion, and efficient causality, are one and the same kind of flow in the system of St. Thomas.

¹ "Omne quod movetur quantum ad aliquid manet et *quantum ad aliquid transit*. . . Unde manifestum est quod Deus moveri non potest."

I. q. 9, a. 1, c

In other words, resultance is not true efficiency, precisely because it is not true transmutation or motion, and not because it does not involve an exercise of "force." If this be a correct representation of the teaching of the Angelic Doctor regarding the production of forms, the reader may judge for himself whether it fits in with the dynamic rather than with the kinetic theory of efficient causality.

In confirmation of my reading of St. Thomas I will quote some passages in which he identifies action or efficient causality with the motion or transmutation of forms. "The essence of an action," he writes,¹ "consists in this, that *action designates a form in motion or in course of transmutation*, as proceeding from an efficient cause." Again:² "*action and being acted on [passio]*, are quite the same thing, *which is a form in flux* or in course of production." Once more:³ "action, being acted on, and motion are quite the same thing." And he goes on to illustrate his meaning: "Hence, *heating* is nothing else than *heat as it is in flux*; inasmuch, that is, as it is the act of something in potentiality, *which is the same as motion*."

¹ "Ratio actionis, ut est praedicamentum, consistit in hoc, quod actio dicit formam in motu vel mutatione, ut est a causa efficiente." *Opusc.* 68, tr. 5, c. 7.

² "Actio et passio sunt una res et eadem, scil. forma quae est in fluxu vel fieri." *Ibid.* c. 10.

³ "Actio et passio et motus sunt una et eadem res. Unde calefactio nihil aliud est quam calor ut est in fluxu, prout scil. est actus existentis in potentia, quod idem est quod motus. Verbi gratia, dato quod aqua calefieret ab igne, certum est quod in ea esset aliquis calor causatus a calore ignis, qui calor, quantum ad esse suum consideratus est forma, quae est qualitas in tertia specie qualitatis. Secundum autem quod est in fluxu, scil. quod magis et magis participatur in aqua, dicitur motus. . . Et secundum quod habet respectum ad ignem ut ad causam efficientem, est actio. . . Unde, ratio actionis, prout est praedicamentum, consistit in hoc, quod actio dicit formam in motu vel mutatione, ut est a causa efficiente." *Ibid.* c. 7.

For instance, when water is heated by fire, it is certain that there is some heat produced in the water by the heat of the fire. This heat, considered in its essence, is a form, which is a quality of the third species. *Inasmuch, however, as it [the form or quality] is in flux, that is, as it is more and more communicated to the water, it [the same form or quality] is called motion.* . . . Inasmuch, again, as it has a relation to the fire as to an efficient cause, *it [the same form] is action.* . . . Hence, the essence of action as a category consists in this, that *action designates a form in motion or in course of transmutation* as proceeding from an efficient cause." Here, once more, we may see how St. Thomas understood the definition of an efficient cause which he himself had learned from Aristotle,—“an extrinsic principle from which motion flows ;” *motion* being nothing else than a *form in flux or in course of transmutation.*

Is this language in conformity with the kinetic or with the dynamic theory of activity? “Heat is a form or quality”; “heating is nothing else than this quality in flux”; hence “action of every kind consists essentially in a form in motion.” I find no mention of “force” as a reality distinct from the faculty and its movement, and as being a condition and cause of real activity. Is it possible that even the Angelic Doctor did not understand how accidental forms may be produced efficiently?

III.

I will ask you to bear well in mind these two principles of St. Thomas,—that resultance is not efficient causality precisely because it is not transmutation or motion, and that motion itself is merely “a form in flux,”—while I go on to explain my own view with regard to the manner in which accidental forms are produced. This statement

will be my direct answer to the argument in favour of the dynamic theory with which the present Chapter opened.

1. At the outset I draw a distinction between the first instant in which a substance exists, and all the subsequent period during which it may be preserved in being. In the first instant it is produced by God with all the accidental forms that proceed from it by way of resultance. Thus, human souls have from the beginning their faculties of intellect and will; bodies have quantity modified in many ways; they have some particular place, figure, weight, and so on. All Catholics must admit that God could, absolutely speaking, produce matter without any actual extension; in which case it would have no accidental form except time and location. This, however, is out of the natural order; so that unless there is some special reason for supernatural intervention, matter can never be created without quantity. This accident in turn must have its modes,—some particular shape, colour, weight;—and so on with regard to the other necessary forms.

It is my opinion that all these accidental forms subsisting thus in a creature at the very first instant of its existence, are concreated with the substance. Like all other products they have an efficient cause, which is the agent that produced the substance, not the substance itself. When God creates a human soul, He alone gives it its faculties of intellect and will; when He created matter at the beginning, He was the sole efficient cause of such accidental forms as it supported in that first instant. This seems to be, beyond doubt, the teaching of St. Thomas, according to whom these forms emanate from their substances by natural resultance; a process which the holy Doctor carefully distinguishes from efficient causality in the strict sense of that term.

2. Of the accidents that are thus concreated with their substances in the first instant, some may remain more or less permanently, while some give place to others, flowing from form to form. Quantity is retained in matter all through its existence ; but the original modifications of that fundamental accident of matter are being constantly changed. Thus, colour varies ; and a body may be solidified, melted, resolved into gas, without losing the specific mode of extension on which its substantial form is dependent. So, too, the soul retains its faculties the same all through its existence, but does not retain the precise forms with which these faculties were modified at first ; every new idea means a passage from form to form. It will be understood, of course, that these terms are applied to the soul and its faculties only by a certain analogy.

I conceive such accidents as were originally concreated with substances, to be conserved by the action of the Creator as long as they remain unchanged. Thus, it is the same creative act which produces human souls at their inception, which also gives to each its faculties of intellect and will, and which, being continued without interruption, conserves both substances and faculties in existence. Similarly in things material, as it was the Creator and He alone who gave matter its location in the first instant, so it is He only who continues to produce that location by conserving it, as long as the creature does not move into a new position.

In other words, as the substance, while it remains the same, does not efficiently cause itself, in the second or any subsequent instant of its existence ; so neither does substance or accident produce accidents, as long as these remain quite the same as they were at first. The reason is, that, as St. Thomas teaches, activity supposes motion, and motion is transmutation,—cessation of one form and

inception of another ; and as there can be no transmutation where the original product remains the same, so there can be no activity or efficient causality.

3. Suppose, now, *transmutation* to occur in the case of some one of these accidental forms,—say in place ; by moving out of its original position in space a substance gives up its old and acquires a new location. I believe that the created substance which undergoes this change, is one of the efficient causes of the new form. There may be other agents contributing more or less remotely to produce the same effect ; one other there must be,—the Creator and Conserver of the substance. He does not act alone, however, in effecting this new position in space, which is to be attributed also to the substance and its previous location as true efficient causes.

That the Creator contributes to the new location is plain from the way in which that accident is produced. It has been already observed that every piece of matter at the instant of its creation gets a certain location concreated with its substance by the creative act. Matter so produced and located may be conceived either to remain during the second and subsequent instants in precisely the same place as at first, or to be moved one point in space, in, say, the second instant of time. This movement is effected by God, who might have continued to create (that is, might have conserved) the substance in the same point of space ; but who actually does, in the second instant, create it one point away from where it had been in the first. In other words, the substance could not be in the second point of space, unless God, in continuing to create it, put it there. He moves it one point, therefore, and is thus an efficient cause of the new location, which He concretes with the substance in the second instant.

Now it is quite plain that the substance itself moves

when it is thus made to move by God ;—for how could He make it *to move* unless it *moved*? Both locations are sustained in the substance, which thus passes from one to the other. It is not God that passes but the creature, to which He has really given both these accidental forms. But it is the teaching of St. Thomas, as we have seen, that a new form which is produced by transmutation, is efficiently caused by the substance from which it flows, and by the accidental form from which it was changed by transmutation. Hence the substance which is moved by God from place to place, as well as the place or precise position from which it was moved, are both truly efficient causes of the new location. The substance acts, not immediately but through its property of location which it originally got by natural resultance. There is a form—place—in a state of flux ; this is motion, transmutation, action, efficient causality.

4. If you are prepared to hold—what I believe to be the teaching of St. Thomas, and to be confirmed by all the revelations of physical science in modern times,—that all the other accidents of matter, except place and time, are but modifications of quantity ; you will have no difficulty in applying to them all what has just been said of location. A globe of wax becomes a cube by changing the location of some parts of its substance. A bell sounds by vibrating, that is by changing place with a certain rapidity and frequency. The vibrations of sound pass along the air, precisely because the particles of which the atmosphere is composed change their location in a similar manner. When iron becomes hot and bright, it vibrates like a bell ; that is, its particles also change their positions in space. The heat and light pass along the luminous medium in forms somewhat similar to the air-vibrations by which sound is conveyed. And if cohesion, chemical affinity, gravitation, and magnetism,

act by way of vibrations, somewhat as light, heat, and sound ; and if they differ only, as these do, by reason of the different shapes and sizes which the vibrations assume, or by reason of the rate of speed with which they travel ; all these qualities are transmuted just like figure and location. And as I have already stated my belief, that when transmutation occurs in the accident of location, the new form is produced by God in the first place, and also by the substance acting through the medium of its quantity and previous location ; so I hold with regard to all other accidental forms of matter, time alone excepted, that when they are produced by transmutations, they are efficiently caused by God, by the material substance, and by the forms that pass away in the course of the transmutation. Nor do I see the slightest reason, whether of necessity or of utility, for having recourse to "force" as a means of effecting these transformations.¹

5. It remains to deal with the accidental changes which occur in spirits, such as angels and the human soul. What has been said of the local movements of matter, applies equally to the strictly local motions of spirits ; those which take place, for instance, when an

¹ In confirmation of the doctrine of the text I beg to call attention to the following extracts from St. Thomas:—"Without local motion there can be none of the other motions, . . . neither can there be alteration unless by a pre-existing change of place": "*sine ipso [motu locali] non potest esse aliquis aliorum motuum, . . . neque alteratio potest esse nisi praeexistente loci mutatione*" (Cont. Gent. 3, c. 82).—Again: "*local motion is the principle and cause of all other motions*": "*motus localis est principium et causa aliorum motuum*" (Quodl. 3, a. 6, ad obj.). "Although in bodies there be many motions, yet all these are referred to the local motion of the heavens, which is the cause of every corporal motion, and therefore all are touched by local motion": "*quamvis in corporalibus sint plures motus, omnes tamen ordinantur ad motum localem coeli, qui est causa omnis motus corporalis; et ideo per motum corporalem tanguntur omnes.*" (1 D. 8, q. 3, a. 3, ad 3.) Extracts like these might be multiplied indefinitely almost: how do they fit in with the dynamic theory?

angel moves from one place to another, or when a human soul leaves its body at death. The difficulty is to apply to the transformations which take place in the *qualities* of spirits,—as when a new idea is produced by a new thought,—what has been said of the change in the qualities of matter.

It seems to me that the very same principles apply ; in such manner, however, that the terms denoting motion must be understood not literally but only analogously. I conceive an idea to be some kind of image into which the soul resolves itself through the medium of its intellect ; somewhat as, when vision occurs in the organ of sight, there is an image of the object seen impressed on and again expressed within the eye. An angular white object becomes round and red by a change in the local position of its substance ;—after the change it impresses on our senses images which differ from those previously impressed by the same object, by so much as the parts of the organ are now differently located. And it is thus, though only in some similar and analogous fashion, that the intellect is changed, when from the idea of round or white it passes to that of angular or red. Within the spiritual faculty there is produced some likeness of the objects,—which necessitates something similar to local movements within the organs of sense. I freely admit that these spiritual motions are not true local disturbances ; yet is there in them a reality of change,—of transmutation, to use St. Thomas's term—which we are unable to represent in any other manner. And as God and matter combine to produce transformations in the qualities of bodies, so God and the spirit combine in a manner somewhat analogous to effectively produce new accidental forms in immaterial things.

Accordingly, in reply to the question how transmutations are produced in the accidental forms of immaterial

MOTION.

substances, I would say that they are produced as in matter, by God in the first place, and also by the spiritual substance with its antecedent forms; and that this occurs in a manner analogous to the manner in which the qualities of matter are transformed by changes in its location.¹

IV.

I began this Chapter by proposing an objection commonly urged by Dynamists against the kinetic theory. They contend that accidental forms cannot be produced unless by the exercise of what they call "force." They ask, how, according to kinetic principles, these changes can be effected.

I have shown that, though this is a question to which the Schoolmen devoted special attention, they do not seem to have had recourse to "force" for an explanation; and that St. Thomas in particular refers to "transmutations" and "motions,"—"forms in flux,"—to explain how these new accidents may be produced efficiently. Following his guidance I have stated my own opinion:—that these new forms are produced by God in the first place, and in most cases by the substance also with its pre-existing accidents. I have endeavoured to point out how this view harmonizes with the teaching of physical science. I say, then, that accidental forms are constantly being produced *de novo*; and that the production is due to transmutations, fluxes, motions, of the substance and its forms; and not to any intervention of what Dynamists call "force." Hence, these operations are best explained in accordance with the kinetic theory.

¹ In connection with the formation of ideas, see Note, p. 52.

CHAPTER XIII.

PRODUCTION OF FORMS : SUBSTANCES.

FROM what has been said in the last Chapter with regard to the manner in which accidental forms are educed from potentiality, whether within us or in the world around us, the reader may predict how I would reply to that portion of the argument of the Dynamists which deals with the eduction of substantial forms. Here, again, there is no dispute as to the facts. I hold the recognised Catholic doctrine that the soul is the substantial form of the human body. It seems to me, moreover, that the analogy of this union in the case of man, adds great force to the reasons which go to prove that in the lower orders of being something similar is to be found. It matters not to the present inquiry whether it can be proved conclusively that not only brutes and vegetables but inorganic bodies are composed, like man, of matter and form. We suspect, at least, that it is so ; we think it much more probable ; this is a sufficient reason for an inquiry as to how these lower substantial forms may be produced.

It will be remarked that I confine the investigation to the lower forms,—including all, whether vital or non-vital, except human souls. With regard to these there is no disagreement among Catholics : we are bound to believe that the souls of men are created immediately by God, without any immediate efficient co-operation on the part of creatures. It will be necessary, however, in discussing the origin of the lower forms, to refer occasionally to the way in which human souls are produced, as illustrating the matter with which we are directly

concerned. I have to explain how substantial forms may be generated by mere motions without the exercise of what is known as "force."

I.

Before giving a direct statement of my own views, I would like to ask Dynamist opponents how precisely they understand "forces" to operate in the production of substantial forms. For, though these realities are said to be *educed from* the potentiality of matter, this eduction must not be understood as implying that the form really existed in matter before being educed therefrom. It is not like money in a purse, or a figure concealed by a veil. The new form was in matter only *potentially*, in the sense that matter had a *capacity of receiving* such a form. In a similar manner we are wont to say, when substances are created, that they are *produced from nothing*, or *brought out of nothingness*; and sometimes, that they are *brought out of pure potentiality*; which expressions would be ridiculous if they implied that the creatures before their creation were anything real in potentiality or in nothingness. In this connection Fr. Pesch writes as follows:—

"When forms are said to be educed from the potentiality of matter, it is not to be understood that their proper entities were previously contained in matter, since they were there only *in potentiality*. Now, being contained in potentiality is ascribed only to a thing whose possibility but not actual identity is in another."¹

And this is the universally received teaching.

¹ "Cum formae e potentia materiae educi dicuntur, non est putandum earum proprias entitates in materia antea contineri, cum nonnisi in potentia contineantur. Sed in potentia contineri illud dicitur cujus non actualis entitas sed possibilitas est in alio, quatenus est in illo unde fieri potest." *Inst. Phil. Nat.* n. 196.—The same doctrine will be found in Zigliara, *Cosmol.* 17, VI.; Goudin, *Phys. P.* 1, D. 1, q. 3, a. 2; and in almost every writer on the subject.

Seeing, therefore, that when substantial forms are educed from the potentiality of matter, they are really produced *de novo*, the question arises: how does the created agent, the parent form, manage to produce them? By its "force"? Is "force," then, the immediate principle from which these forms emanate? But, "force," is an accident; and it is utterly unintelligible how substances, such as these forms are, can flow from or be produced by accidents,—realities altogether inferior in the scale of being. *Nemo dat quod non habet*; no one ever yet produced anything but what he already possessed, at least in some higher form. How, then, can a substance be produced by an accident such as "force"?

This argument is not mine; it was urged long ago by Scotus and repeated by Suarez against what they and the Schoolmen generally regarded as the teaching of St. Thomas:—

"An instrumental form, of itself, and without an actual [and immediate] influence from the principal agent, cannot be a sufficient proximate cause of the production of a higher form. This principle seems to me to be manifest almost from its very terms; for, if the lower form is not actually aided by the higher, it operates only by what it actually has in itself; and since this is an entity of a lower order, it can never of itself produce anything more perfect."¹

So reasons Suarez, "making use," as Fr. Harper admits, "of an argument of the utmost cogency. It is impossible that the act of generation should be the term

¹ "Forma instrumentaria per se sola et quasi destituta ab actuali influxu principalis agentis non potest esse sufficiens in ratione causae proximae ad efficiendam formam se nobiliorem. Quod principium videtur mihi fere ex terminis notum, quia si illa forma tunc non juvatur actu superiori, tantum influit per id quod in se actu habet; cum ergo illud sit quid imperfectum, non potest per se solum efficere aliquid perfectius." Suarez, *Metaphys.*, D. 18, S. 2, n. 22.

of alteration or of accidental effects, because of the nobility of its order, which is under no circumstances reducible to the latter. The one is accidental, the other substantial. Wherefore, alteration terminates in the genesis of a quality; while the generating act terminates in a substantial form. It is the primitive difficulty over again : and a most serious and vital one it is."¹

In reply to this argument the disciples of St. Thomas usually contend, in the words of their master, that "the active qualities in nature act by virtue of their substantial forms; and, accordingly, a natural agent produces something like to itself not only in quality but even in substance." Hence, in explanation of the nutritive and other substantial effects of the sacramental species in the Eucharist, the holy Doctor writes :—

"The change which is towards a substantial form is not produced immediately by the substantial form [of the agent], but by means of active and passive qualities, which act in virtue of their substantial form. Now, this instrumental virtue is by divine power preserved in the sacramental species, just as it was before [consecration]; and therefore they can produce a substantial form instrumentally; for, a thing can thus act beyond its nature, not as by its own power, but by the virtue of the principal agent."²

I take it, therefore, that the Dynamists' explanation of the way in which substantial forms are produced by

¹ *Metaphys. of the School*, p. 74.

² "In rebus naturalibus non invenitur aliquid agens nisi forma accidental, quae est forma activa vel passiva. Non ergo per operationem naturae producitur forma substantialis. . . . Dicendum quod qualitates activae in natura agunt in virtute formarum substantialium, et ideo agens naturale non solum producit sibi simile secundum qualitatem, sed secundum speciem." 1 q. 45, a. 8, ad 1. "Immutatio quae est ad formam substantialem non fit a forma substantiali immediate, sed mediantibus qualitatibus activis et passivis, quae agunt in virtute formae substantialis. Haec autem virtus instrumentalis conservatur in speciebus sacramentalibus divina virtute, sicut et prius erat; et ideo possunt agere ad formam substantialem instrumentaliter, per quem modum aliquid potest agere ultra speciem, non quasi virtute propria, sed virtute principalis agentis." 3 q. 77, a. 3, ad 3.

accidents such as "forces," would be something to this effect:—"Force," though but an accident, can produce a substance, not of itself, but by means of a virtue which it receives from the substance of the agent whose "force" it is.

Against this explanation it is urged by Scotus that the "virtue" which is said to emanate from the substance, must itself be either a substance or an accident. It is manifestly not a substance; therefore it is an accident; and thus the original question returns: how can a virtue which is but an accident enable "force," another accident, to produce something altogether superior to both in the scale of being, to wit, a substantial form?

I have read carefully what both Suarez and Fr. Harper have to say in reply to this objection of Scotus, and do not find anything which seems of the least avail to relieve Dynamists from the difficulty of their position.

1. Suarez expressly maintains that no mere quality—"force," therefore, included—is or can be made capable of producing substantial forms, unless the substance itself in which the quality is supported, co-operates immediately in the production. He further teaches most expressly that whenever the substance of the generating agent is not actually present, the form generated is and must be produced by an extraordinary intervention on the part of God.¹

Now, in the generation of living things,—those, at least, of the higher species, from the Thallophytes, among the Cryptogams, upwards,—the substantial form of the offspring in the instant of its eduction from matter, is not in immediate contact with the substance of its male parent, to the activity of which its eduction is due. Indeed, both parents act by secreting

¹ Disp. Cit. Sec. 2, nn. 22, 28, 40.

substances, which they afterwards manage to combine ; and these secretions are different in nature both from the organisms which produced them, and from those which by their own combination they help to produce. The sperm of the male parent and the ovum of the female, before this combination takes place, are almost as much inferior to their principles and to their product, as they themselves are superior to mere accidental forms. Hence, according to the teaching of Suarez,¹ since the substantial form of the offspring is educed at a distance from the only substances which are like to it in kind,—those of the parents,—it must be educed from matter by the immediate act of God ; the qualities—“forces” if you will—emanating from the parent substances, merely co-operating in the eduction, but being unable of themselves to produce the offspring, even with the ordinary divine concurrence.

I would ask any Dynamist whether he is satisfied with this view of the matter. Is he content to believe that God must interfere specially to educe the substantial form in all these cases? Suarez thought so ; and surely we all have a right to think with him on a matter such as this.²

Nay more, he admits that there are many cases even in the generation of inanimate objects, in which the

¹ “Quando accidentia a sua forma disjuncta ita efficiunt substantialem formam, ut non possint a propria forma juvari, necesse est ut influxus propriae formae qui ibi deest, per concursum alicujus causae superioris suppleatur, quae causa esse non potest intelligentia creata sed esse debet aliqua causa corporea, ut sol vel alia similis ; vel, si haec etiam desit vel insufficiens inveniatur, per concursum primae causae totus ille defectus supplendus est.” Suarez, l. c. n. 28. I have taken it for granted that modern Dynamists will agree that the sun is not able to generate living things ; which is indeed, the teaching of Suarez himself. Cf. n. 39.

² This special divine co-operation is altogether different from the ordinary *concursus divinus* ; it is a special form of concurrence, which is requisite only on the occasions referred to in the text.

PRODUCTION OF FORMS: SUBSTANCES.

substantial form is produced immediately by something unlike to it in kind. This is always so when the form of a corpse is produced at death; the dead body, whether of an animal or of a plant, is not the same in nature as the living form which preceded it; or as the form of the instrument—axe or poison—by means of which dissolution was caused. If the Jesuit Doctor knew Chemistry as well as his brethren of to-day, he would be able to enlarge his list of cases in which substantial forms are educed immediately by agents unlike in nature to the effect. Oxygen and hydrogen may be formed from water by an electric current passing through the liquid between two metallic wires; the products are neither water nor metal. The same electric current passed through the same gases will produce water, a product which is neither oxygen, nor hydrogen, nor yet a metal such as the wire. This applies to other cases of chemical change; so much so that, as far as I am aware, there is no instance in which a new inorganic substance is produced immediately by the agency of an antecedent of the same nature as itself.

Now, Suarez with the whole body of the Schoolmen supposed that the only substance capable of co-operating with accidents in the education of a new substantial form, is one whose nature is similar to that of the product, or in which the substantial form of the latter is comprised in some eminent manner. Where such an antecedent does not co-operate in the education, its efficacy has to be supplied by the First Cause. But, we have just seen that, according to modern chemistry, new substances are in no case produced by agents similar to themselves in nature,—not, at least, in the inorganic world; and the theory of the intervention of superior agents—the heavenly bodies, the sun, &c.—is now exploded. Hence it seems to me that if Suarez had known

Chemistry as it is now known, he would require a special divine interference in every case in which a substantial change occurs in the inorganic world.

When the electric current resolves water into its two constituent elements, what else but God could produce the substantial forms of the gases? Not the water, nor the metal wires; inasmuch as they are not like the gases in nature, nor do they contain the forms of these products in any eminent manner; and it was, as I have said, a principle universally admitted by the Schoolmen, that substances are produced only by agents like or superior to themselves.

You may say that the gas-forms are contained eminently in the higher form of the water; but then you have to explain how the water can be produced from the gases by the same electric spark. When, therefore, chemical changes occur in the inorganic world, there is no created agent present which in the opinion of a Schoolman like Suarez would be able to produce the new form; and accordingly, in conformity with his own principles, he should maintain that in all these cases the new substantial form can only be educed from matter by a special intervention on the part of God.

Let me recall here the question proposed at the opening of the Chapter:—by what agents are substantial forms immediately educed from matter? Suarez' answer is: in many cases only by a special divine intervention. I have pointed out how the principles that carried him thus far, would have carried him much farther, if his knowledge of Chemistry had not been at fault. Were he living now, he should hold that except in the case of vital growth by nutrition, and possibly also in case of the development of the lowest species of organisms, all substantial changes whatever, whether resulting in vital

or in non-vital substances, are effected by a special intervention of divine power, such as he advocated in case of the generation of the higher animals, and also in case of the production of the corpse-form at death. The principle on which he and all the Schoolmen relied, and which leads to these conclusions, is, that no accident,—and therefore not even “force,” if there be any such reality,—owing to its inferiority of nature, can be made capable even by God of educing substantial forms out of potentiality, independently of the special intervention of an agent of a higher order. Dynamists may here ask themselves how this tells on their contention, that “force” is sufficient to produce a form of any kind, the human soul excepted, and that any other view of the matter is uncatholic.

It may be urged that, though Suarez denied the capacity of accidents for the eduction of substantial forms, without a special concurrent interference of divine power ; and though his principles require him to extend this doctrine not only to the generation of living things, but to all cases of chemical change in the inorganic world ; yet he distinctly asserts that in all these cases accidents of some kind contributed by the created agent, *co-operate* with the divine activity in the production of the new substance. If, therefore, “force” be one of these accidents,—and they are described by himself as ‘virtues,’—there is no reason why, as it acts concurrently with the superior activity, it may not be made capable of operating alone. This is precisely what is taught by the Thomists ; so that, in so far as Suarez sides with Scotus against the disciples of the Angelic Doctor, the Jesuit theologian is inconsistent.

I freely admit that the teaching of Suarez is not altogether consistent ; it remains to be proved, however, whether he had better go the whole way with the

Thomists in asserting that accidents may be made capable of educing substantial forms without any special assistance, or with the Scotists in denying that any accident can ever contribute proximately to such an effect. We shall see.

II.

Fr. Harper does go the whole way with the Thomists; he thinks the difficulty raised by Scotus can be got over without deserting their principles even in part. I will ask you to consider whether the position taken up by the author of *The Metaphysics of the School* is an improvement on that of his great predecessor and guide.

The light which recent investigations in Chemistry and Biology have thrown on the production of substantial changes, gave Fr. Harper a great advantage over the earlier Jesuit philosopher; yet with all these advantages he has nowhere told us from which substance accidents derive the "virtue" by means of which they are supposed to produce chemical changes in the inorganic world.

He teaches that when carbonic acid is produced, whether by combustion or in the lungs of animals, the accidents of the combustible or of the animal get from some created substance a "virtue" whereby they are enabled to produce the substantial form of the carbonic acid. From which substance does this virtue proceed? From the substance of the coals, or of the animal, or of the air,—which in either case contributes its oxygen,—or from all three? It is a pity that Fr. Harper does not say which; for then we should be able to tell how far he believed that substances resulting from changes in the

inorganic world, require to be produced by agents like in nature to themselves.

Or, let us suppose that oxygen is set free to act on hydrogen,—in the atmosphere or where you please. A new substance of some kind—let us say, water—will be the result, when the proper conditions of heat, &c., are present. The substantial form of the water is produced, according to Fr. Harper, by the immediate action of the accidents of the hydrogen and of the oxygen ; which, however, must have received a “virtue” from some substance capable of producing that effect. Which substance? If from the oxygen or the hydrogen, we have a most distinct departure from the teaching of all the Schoolmen, that substantial forms are produced by agents like or superior to themselves. Surely the oxygen or the hydrogen does not contain the form of water eminently ; and I do not suppose Fr. Harper would have recourse to the sun or any other of the heavenly bodies.

Similarly, when a partridge is shot, the stroke of the lead produces the substantial form of the dead bird. The accidents of the metal must, we are told, have got “virtue” from some substance to enable them to produce this form. From which substance? From the lead? But, it is supposed by the Schoolmen that lead is able to produce nothing but lead, or what may be eminently contained therein ; and the same applies to every other agent that may by any probability interfere to operate in the case. I have the gravest doubts whether this theory of borrowed “virtue” applies to the production of inorganic substances or of other non-living forms, and regret that Fr. Harper did not favour us with his opinion on the question.

He has, however, treated at length of the more difficult question of semination, and how it contributes to

the production of the substantial form of the foetus, especially in the generation of the more complex organisms, such as mammals. For, it should be borne in mind in connection with this portion of the subject, that it was the teaching of the Schoolmen that the foetus does not reach its full perfection of species till some time after the fertilization of the ovum,—the period usually varying in its duration according to the perfection of the organism when it is complete. Thus, the eggs of the lower insects take less time to develop than those of fishes or of birds; and these again less than the foetus of mammals, especially of those higher orders which approach nearest to man. This doctrine of the School is confirmed by all the investigations of biologists in modern times; so that the problem is, not only how the “virtue” of the substance of a male parent may be communicated to its semen; but how from this it may pass into the ovum, and there develop in a continuous process successive forms of a higher and still higher order, till after many generations the substantial form becomes so perfect that the next change will be the introduction possibly of a human soul. Each of these successive forms is said to be produced by its immediate predecessor, by means of a “virtue” communicated to the semen from the substance of the male parent; the question, therefore, is, in what does this “virtue” consist, and how does its operation take place?

For, the original difficulty raised by Scotus still remains to be got over:—no agent can produce any form higher than itself in the scale of being. This is, as we have seen, admitted throughout by Fr. Harper to be “a most serious and vital difficulty,” “an argument of the utmost cogency.”¹ It is because of the cogency of

See p. 301.

the argument that he first explains the teaching of Suarez, and then devotes a long Appendix to harmonizing what he regards as the teaching of St. Thomas with the results of modern biological research. What, then, is the explanation of this "most serious and vital difficulty"? I can find nothing more than a statement that the thing can be done; lower forms may get virtue to produce others of a higher order; St. Thomas has said so, and the case is closed.

Fr. Harper calls attention to what is very evident,—that the semen, though it also operates through its accidents, is not itself an accident but a substance. The same is true of each of the lower forms which are successively developed in the foetus till the full species has been reached. This is very obvious; but it does not seem to help us in the least out of the difficulty:—how can a lower form, substance or accident, be fitted for the production of one which is higher in the scale of being? It is also quite true that each successive form differs but slightly from its predecessor. It differs, and is higher; were the distance ever so little, it is substantial all the same. How, then, can a lower form produce what is more excellent than itself?

Fr. Harper has recourse to certain "vital spirits," which, according to the teaching of St. Thomas, are communicated by the male parent to its semen. But, what are these "vital spirits,"—substances or accidents? If accidents, the old question returns: how do they enable the semen to produce a substantial form? If substances, the difficulty still remains; for, be these spirits ever so vital, they do not render either the semen itself or the first forms developed in the ovum, as perfect in nature as the organism in which the whole process of generation terminates. Unless, therefore, we are prepared to admit that the semen from the beginning

contained, actually and not merely potentially existing within it, all the forms through which the foetus passes in the course of its development,—and what Catholic will commit himself to such an extravagance?—the original difficulty raised by Scotus remains unanswered : how can lower forms produce those which are higher, unless by way of disposing the matter for the operation of another and superior agent? And, except the First Cause, what superior agent is there to interfere in the process?

III.

The reader will kindly bear in mind that, so far, I have been merely explaining one of the many objections to the theory which ascribes the origin of substantial forms to an exercise of “force.” I shall now proceed to state my own views as to the way in which the new substances are produced, and the agents to whose activity they owe their development.

It seems to me that God is the only efficient physical cause of the eduction of substantial forms, and that the operation of the created agent is restricted to the production in matter of accidental dispositions to which the various species of substantial forms are immediately due. In other words, the operation of the creature is terminated physically in the production of certain qualities in matter, and when these have been fully developed, they are moral causes of the substantial forms which correspond to each.

This opinion is not new; it is mentioned by Suarez, who even goes so far as to pronounce it probable,¹—no small concession from one who entertained such Dynamistic notions as he. It is undoubtedly simple, relieving

¹ *Metaph.* D. 18, S. 1, n. 16.

us at once from the difficulty which pressed so heavily on the Thomists. The motions of accidents, according to this doctrine, terminate in accidental forms only, and no mere "virtue" is capable of flowing on continuously till it becomes a substance. Those who hold this view are also saved from the inconsistency of maintaining on the one hand, that substances are always generated by agents like to themselves in species; and yet being forced to confess that the fall of a stone may change a man into a corpse, that an electric current may generate hydrogen and oxygen from water, that carbon and oxygen may unite to form carbonic acid.

From which like substance does the virtue come whose motion is terminated in the forms of these products? Not, surely, from any previously existing corpse, or water, or carbonic acid. Whence then? From the sun? The stars? The heavenly intelligences? All these have been suggested by the Thomists of the old school; but really the day is gone by when an honest man could face the scientific world with notions such as these.

I prefer to believe that material agents, being capable of acting only by way of motion, are able by their actions merely to communicate these motions to their fellows. When a candle is lighted, the heat of the wick is for some time entirely occupied in melting the wax,—that is, in loosening the material of which that substance is composed. The heat continues, and the wax becomes a gas; the molecules are now so much loosened as to be altogether separated from one another. The motion is increased still further, with the result that the molecules themselves of which wax-gas is made up, are modified in their extension ever more and more, until a point is reached when, if the heating goes on, the wax-form must cease, as surely as a man's soul must leave his body when he has been stabbed to the heart.

The movement does continue, and with the very slightest degree of increase the wax is resolved into what are called its component elements,—hydrogen, carbon, and whatever else they may be. Here we have one action of the created agent,—the action of heating, and at least four specifically distinct effects produced :—(*a*) the accidental form of heat communicated to the wax, (*b*) the cessation of the substantial form of that substance, the production (*c*) of hydrogen and also (*d*) of carbon.

Now it seems to me that of these four effects,—and more might possibly be reckoned,—the first only is produced physically by the heat-motion ; and that the other three must be attributed to the agency of God, who is bound to produce them when the wax has been heated to the proper degree.

Be careful to note that all through the process of combustion, the action of heating, as such, is not by any means without producing an effect. At every instant it is terminated in a form ; which does not, however, remain fixed or crystallized, but passes on, continuously changing from instant to instant. Moreover, according to the opinion I am propounding, the substantial forms developed never enter into this flux of forms ; which consists merely in an ever-changing succession of degrees of heat.

As the process of combustion is continued, the heat-waves are converted into light and other accidents, which in turn after a little time may be transformed into heat. The production of all these accidental forms exhausts the entire energy of the heat developed in the candle ; so that there is not the smallest vibration to spare for the production of substances, even in the hypothesis that a heat accident were able to produce a substance. Physical science knows of no such spare

energy.¹ Since, therefore, the new substantial forms must result from some activity, and since they do not result from mere heat, I know of no other agent but God to which they can be attributed.

The principles just explained may be applied to every case in which a new substance is generated; as, for instance, the evolution of an animal foetus or the production of a corpse. In either case there is a created agent which works by means of motion, whereby the extension and the qualities of the material operated on are continuously changed. A period may elapse during which these changes are merely accidental; as, for instance, during illness. At length, however, the boundary line of the extension to which the particular species of form operated on is due, is reached; one vibration more,—one more pang to the dying animal, the slightest addition to the growth of the foetus,—and the fabric will topple over, and there will be an altogether new pattern in the kaleidoscope. The turn is given; and a new substantial form is necessarily the result. The accidental motion remains in quantity precisely what it was; not the least particle being lost or gained in the production of the new substance.

¹ From the amount of energy released in the combustion of coal or of gunpowder, it might seem as if there were some spare activity which might have been terminated in these substances at the time of their production. No physicist, however, would assert that the heat of the sun is converted into the *substance* of coal; though it is said frequently to be converted in coal into energy of position. It should be remembered that the heat latent in a lump of coal is no more a substance, than is the latent heat of water in which ice has been dissolved. In both cases the latent heat is an accident, which some represent as "force," but which as we have seen is best conceived as a form of motion,—not actually existing in the molecules of the coal, so much as in the ether, in which the coal is immersed, and which can act on the combustible with special force when the molecules of the latter have been separated by heat from the shelter of one another.

IV.

The arguments which have been urged against the doctrine just explained may be divided into two classes, —those based on the testimony of the senses and intelligence, and those which are drawn altogether from authority. I purpose to examine both classes in order.

1. Of the first class I do not find any that presents much difficulty. Two are urged by Suarez,¹ who took them from St. Thomas ; they have been repeated in one form or other by all who belong to the same school.

The first is to the effect that “our faculties tell equally that fire heats and that it generates fire : and so also we are aware that the sun produces minerals, and that under its action the earth generates plants.”²

In reply to assertions of this kind nothing can be said except to assert the contrary. I have never seen a substantial form educed from matter immediately whether by fire, or sun, or earth. That these agents contribute to the production of accidents to which in the last stage of their development are due new substantial forms, I admit most readily. But where is the evidence to show that the actions of the agents mentioned reach even to the newly produced substances? Suppose a Materialist were to copy this argument and say that he perceives men producing men in the same way as the lower species are produced ; every Catholic would answer at once that the human parent's action reaches only to the last disposition, whereby the matter of the foetus is made fit

¹ *Metaph.* D. 18, S. 1, n. 16; compare Pesch., *Inst. Phil. Nat.* nn. 60, 202, 625; though he writes in the full light of modern science, it has not revealed to him, in relation to this question, anything that was not known to Suarez and St. Thomas.

² “Sicut videmus ignem calefacere, ita et generare ignem, et solem producere mineralia, et terram actione solis germinare herbam &c.” Suarez c. Cf. Pesch., nn. 60, 202.

for the reception of a human soul. I apply the same principle to the generation of the lower forms, and declare that, as far as I can perceive, the generative action of man and of beast go precisely the same length.

But, it may be urged, the human soul is created, whereas brute forms are merely educed from the potentiality of matter. I admit it. What then, is creation? It is eduction from *pure potentiality*. Every form is brought into being from potentiality of some kind,—from the kind of potentiality in which it was before becoming actual. Now, the only potentiality which brute forms have, is the potentiality of matter; in matter and in it alone can they ever exist. Hence, it is only from the potentiality of matter that they can be educed at all. Rational souls, on the contrary, are capable of existing apart. Accordingly, their potentiality is *pure*, and they can be and are brought from it into being. But to “create” a thing, in the language of the Schools,¹ is to bring it into existence, not from the potentiality of matter, but from potentiality pure and simple. Hence, if the souls of men are created, whereas lower forms are merely educed from matter, the reason is, not that the action of the generator reaches farther in one case than in the other, but solely because the potentiality is different in the two classes of forms.

The only other argument of this class relied on by Suarez² and repeated by Pesch³ and others, is more or

¹ “Cum potentia sit veluti quaedam inchoatio et fundamentum actus, formae quae fiunt ex materia non dicuntur fieri ex nihilo, sed ex aliquo, scil. ex potentia reali. *Ideoque non creantur*, quia creatio est productio rei ex nihilo, i.e. ex nullo praesupposito subjecto in cuius potentia praeconteretur. Similiter quando forma desinit, non annihilatur, *quia semper relinquit aliquid sui*, i.e. *potentiam suam seu materiam*.” Goudin, *Phys.* P. 1, D. 1, q. 3, a. 2; cf. S. Thom. 1, q. 104, a. 4, ad 3.

² L. c.

³ *Ibid.* n. 202.

less of a negative character;—there is no sufficient reason for denying that the efficacy of the creature extends to these substantial forms. The reader must judge from the early portion of this Chapter whether Suarez has not himself supplied reason amply sufficient, by proving that the arguments of Scotus remain unanswered. I would ask the reader, if it be at all possible for him, to consult Suarez himself, and see whether everything is so plain on the other side as it is represented. As for Fr. Pesch, who gravely assures us¹ that the action whereby a substance is generated is not really different from that which produced the accidental dispositions that lead up to the substantial change, but is rather the very same action continued an instant longer; nothing further should be required to supply a reason to him.

For, actions have been always recognised as specified from their objects; in other words, you can know what an action is by seeing what it does. Now, it is almost inconceivable to me, how, in the face of this axiom, any disciple of the Schoolmen could seriously contend that an accident and a substance may be produced by the very same action. Are, then, accidents and substances not specifically distinct?²

2. Turning now to the arguments from authority, it must be admitted that the doctrine propounded in this Chapter is opposed to the teaching of the great body of the Schoolmen, at least as their doctrine is expressed in

¹ "Generatio non videtur esse proprie actio realiter distincta ab actione alterativa usque ad formam substantialem et ad ultimum suum terminum perducta. Nam generaliter eadem actione forma substantialis producitur, qua ponitur ultima conditio; sed haec, cum sit qualitas, alteratione perficitur." *Ibid.* n. 628.

² In justice to Fr. Pesch it must be admitted that this doctrine of his is not uncommon even among the disciples of St. Thomas (see p. 325). This, however, only proves all the more conclusively that there is the very best of reasons for excluding all physical co-operation of the creature from the actions whereby substantial forms are immediately produced.

formal theses. My defence is, that the opinion put forward here is recognised as probable by such a writer as Suarez ;¹ moreover, that on this whole question the Doctors of the School are manifestly speculating ; that many of their ideas are exploded by Chemistry and Biology ; and that, consequently, one is not bound to their speculations as much as if they laid down definite and almost dogmatic conclusions. Finally, they have not been by any means consistent in defending the formal theses in which their speculations are embodied ; so much so that to me it is very doubtful whether some of the ablest of them really meant what their formal theses convey.

(a) To begin with St. Thomas. Nothing, apparently, could be more definite than the statements he makes in the treatise *De Potentia*, in the *Summa*, and elsewhere. "According to some," he writes, "the natural agent merely disposes the matter ; and the form, which is the ultimate perfection, comes from supernatural principles. This opinion, however, is proved to be false."² In this passage he seems to have before his mind the very doctrine I have been advocating, and to reject it in the most decisive manner.

Yet I find in Aristotle's *Physics* two whole chapters devoted to proving that substance can in no case be the term of a motion or action, and that as a consequence generations and corruptions are not true actions at all. Thus the Philosopher writes :—

"A thing can by no means be moved, which is simply not something ; for it is impossible for what is not, to be moved.

¹ *Metaph.* D, 18, S. 1, n. 16.

² "Quidam dixerunt quod agens naturale solummodo disponit materiam, forma autem, quae est ultima perfectio, provenit a principiis supernaturalibus. Quae autem opinio . . . ostenditur esse falsa." *De Pot.* q. 3, a. 11.—Cf. 1, q. 45, a. 8 ; q. 118, a. 1 ; &c.

MOTION.

And if this be true, it is impossible for generation to be a motion, since by it what is not is brought into being.”¹

On this passage the Angelic Doctor comments :—

“ He proves that neither of the aforesaid parts [generation or corruption] is motion, first with regard to generation, secondly with regard to corruption. The first he proves from two reasons, of which the first is as follows. What is simply not something, cannot be moved ; for what is not, is not moved. But what is generated simply is not something, because it is simply not-being ; therefore, what is generated simply is not moved ; and hence simple generation is not motion.”²

The philosopher next goes on to explain which of the categories can be the term of a motion or an action, and expressly denies that substance has any such capacity. “ In the category of substance there is no motion, inasmuch as there is no entity contrary to substance.”³ And the Angelic Doctor is not content simply to point out the meaning of the passage, but gives an elaborate explanation of the difficulty naturally suggested by apparent successions of substantial forms ; as, for instance, when the foetus of an animal is developed in the womb. The explanation seems to be, that each species is sharply divided off from its predecessor on the one hand, and from its successor on the other. The change, therefore,

¹ τὸ δὲ ἀπλῶς μὴ τότε οὐδαμῶς [ἐνδέχεται κινεῖσθαι] · ἀδύνατον γὰρ τὸ μὴ ὄν κινεῖσθαι · εἰ δὲ τοῦτο, καὶ τὴν γένεσιν κίνησιν εἶναι · γίνεται καὶ τὸ μὴ ὄν. (Phys. Lib. 5 c. 1. text. 8.)

² “ Ostendit quod neutra praedictarum partium est motus. Et primo quod generatio non sit motus secundo quod neque corruptio. Primum probat duabus rationibus, quarum prima talis est. Quod simpliciter non est hoc aliquid, non potest moveri, quia quod non est non movetur ; sed quod generatur simpliciter, non est hoc aliquid ; est enim non-ens ; ergo quod generatur simpliciter non movetur ; ergo generatio simplex non est motus.” In loc.

³ κατ’ οὐσίαν δ’ οὐκ ἔστι κίνησις, διὰ τὸ μηδὲν εἶναι οὐσίᾳ τῶν ὄντων ἐναντίον. (Ibid. c. 2, text 10.)

is produced by a number of distinct mutations,—by leaps and bounds as it were,—rather than by any continuous motion ; hence, it remains true that motion or activity is never terminated in a substance.¹

Now, this doctrine so expressly laid down and emphasized so often in the *Physics* and elsewhere, is in direct contradiction to the passage from the 11th Chapter of the treatise *De Potentia*. In that passage St. Thomas seems to teach that the motion of the generating agent is terminated, not in an accidental disposition merely, but in the substantial form which follows. In the *Physics*, on the contrary, he as expressly states and insists that no motion of a creature can be terminated in a substance. Which represents the true mind of the Angelic Doctor? Or may it be that on this point his mind was not very definitely made up, and that his meaning would probably lie midway between the two?

There is a similar apparent contradiction to be found in connection with another portion of the holy Doctor's system, the explanation of which may throw some light on his teaching regarding the generation of substances. He seems to contradict himself in precisely the same way with regard to the manner in which the Sacraments of the New Law contribute to the infusion of grace.

Every reader of the Saint's works knows how definitely and frequently he teaches that the physical activity of these sacramental rites reaches to sanctifying grace,

¹ "Una forma speciei secundum propriam suam rationem non habet contrarietatem ad aliam. Primo, quidem, quia in formis substantialibus non attenditur maxima distantia inter aliquas duas formas, ita quod ab una earum non veniatur ordinatim nisi per media ; sed materia dum exiit una forma, potest indifferenter recipere diversas formas absque ordine. . . Secundo quia, cum esse substantiale cujuslibet rei sit in aliquo indivisibili, non potest aliqua continuitas attendi in formis substantialibus, ut motus continuus possit esse de una forma in aliam, secundum remissionem unius formae et intensionem alterius." S. Thom. in loc.

which is thus represented as the term of their efficiency. For instance, in one of the *Quodlibets* he writes :—

“Some say that the Sacraments have no power or force to operate on the soul, but only externally, and that it is a concomitant divine virtue which produces the internal effect. . . This, however, is not sound doctrine. . . Hence, it must be held, rather, that the Sacraments have in themselves the power of causing justification, and of producing the other effects for which they were intended. They have an instrumental power whereby the spiritual effect is produced.”¹

Remark the striking similarity between this passage and that quoted from the treatise *De Potentia*. There also he had said that “according to some, the natural agent merely disposes the matter; and the form . . comes from supernatural principles; which opinion is proved to be false.” Curiously also he relies in both cases on a communicated virtue of some kind.

It would be easy to quote from the holy Doctor's works similar passages in which he seems to teach most expressly that the sacramental action reaches physically even to grace as its term. Thus in the *Summa*² he writes :—

“According to the opinion which regards the Sacraments as instrumental causes of grace, it is necessary to suppose at the same time that there is in the Sacrament some instrumental virtue for the production of the sacramental effect.”

¹ “Quidam dicunt quod sacramenta non habent virtutem vel vim operandi in anima, sed tantum extra, et divina virtus concomitans facit illum effectum. . . Sed hoc non est sane dictum. . . Et ideo dicendum quod sacramenta habent in se virtutem justificandi et ad alios effectus ad quos ordinantur. . . Habent virtutem instrumentalem ad spiritualem effectum.” *Quodl.* 12, a. 14.

² “Ponendo quod sacramentum est instrumentalis causa gratiae, necesse est simul ponere quod in sacramento sit quaedam virtus instrumentalis ad inducendum sacramentalem effectum.” 3, q. 62, a. 4.

And he quotes St. Augustine who speaks of Baptism as follows :—

“ It is not any wonder that water should be said to reach unto the justification of the soul. It does plainly reach unto and penetrate into all the crevices of the conscience ; for, though itself subtle and keen, by the blessing of Christ being made more subtle still, it penetrates into the occult causes of life and the secrets of the mind.” ¹

In these and many similar passages the holy Doctor seems to teach quite definitely that the physical action of the Sacraments is terminated in sanctifying grace as its effect ; so much so that the Thomists have always maintained that their Angelic Master's words are open to no other interpretation. Nevertheless we find him quite as distinctly and definitely laying down the contradictory view.

I have already ² called attention to the letter *Contra Errores Graecorum*, in which he teaches that the infusion of grace is, like creation, an incommunicable action of the Deity. And in his *Commentary on the Sentences*,³ he expressly states that the term of the physical action of a sacrament is the sacramental *character* and not grace ; so, however, that the character disposes the soul for grace, which God is bound to infuse when the soul has received that disposition. It is in this sense only

¹ “ Nec mirum quod aquam, hoc est substantiam corporalem, ad purificandum animam dicimus pervenire. Pervenit plane, et penetrat conscientiae universa latibula ; quamvis enim ipsa sit subtilis et tenuis, benedictione tamen Christi facta subtilior, occultas vitae causas ac secreta mentis subtili ore penetrat,” *Ibid.*

² See p. 63.

³ “ Sacramenta pertingunt instrumentaliter ad aliquem effectum in ipsa anima, quod primo correspondet sacramentis, sicut est character, vel aliquid hujusmodi. Ad ultimum autem effectum, quod est gratia, non pertingunt etiam instrumentaliter nisi dispositivo ; in quantum hoc ad quod instrumentaliter effective pertingunt, est dispositio, quae est necessitas, quantum in se est, ad gratiae susceptionem.” 4 D. 1, q. 1, a. 4, sol. 1.

that St. Thomas would speak of grace as being instrumentally caused by the action of a Sacrament.

It seems to me that this latter is the view which St. Thomas really held with regard to the nature of sacramental activity. If, therefore, he could say, as he so often does, that the physical motion of the Sacraments terminates in grace, though it really terminates only in a quality from which grace results by a distinct action on the part of God ; are we not justified in concluding, *a pari*, that although he so often insists on the motions of created agents being terminated in substantial forms, yet he really means that they are physically terminated in accidents, from which the substantial forms result by as distinct a divine action as in the case of the infusion of grace? Is not this conclusion very natural, particularly if we take into account the passages already quoted, in which the holy Doctor, after his master, Aristotle, expressly denies that the actions of creatures can ever be physically terminated in substantial forms.

(b) The disciples of the Angelic Doctor, however they may express themselves in formal theses to the effect that the motions of created agents may be terminated in substantial forms, are, nevertheless, found to explain away this teaching to a large extent when they come face to face with the objections urged by Scotus against this doctrine.

Thus, according to Cajetan,¹ the action by which substantial forms are immediately generated, does not differ in the least from that which produces the ultimate accidental disposition for the form. If this be so,—and, according to Suarez, the opinion is commonly received among the Thomists,—it is the very same action which at one instant is terminated in a mere accident, and

¹ *Comment. in Summam*, I, q. 54, a. 3; apud Suarez, l. c. Sec. 2, n. 16.

which, being continued into the next instant, finds its term in a substantial form. Nay, according to many, there is no continuation at all; but the same action simultaneously produces both the ultimate accidental disposition and the substance, with not the least particle of motion between the two terms.¹ This is usually² expressed by saying that the substantial form arises by resultance from the disposition; though some object to this use of the word, resultance, as implying that the substance is not the principal of the two effects.³

Now, it is to me inconceivable how anyone acquainted with the Philosophy of Aristotle, can bring himself to believe that the very same motion can be physically terminated in a substance and in an accident, whether at the same or at different instants. To what species could such a motion belong? I know of no test of the specific nature of an action, other than the nature of the object in which it is physically terminated. The action is there crystallized, as it were, in its term. But if there be two terms, as different from each other as substance is from accident, what kind of motion could be terminated or crystallized in both?

Rather than admit that the great body of the Thomists deliberately advocate what I must with reverence call such a monstrosity, I prefer to believe their real meaning to be the same as mine;—viz. that the motion of the created agent is terminated physically in the ultimate accidental disposition for the substantial form, from which the form itself *results*; without any further action

¹ See the extract quoted from Pesch, at p. 318; also Suarez, l. c. nn. 17, 18.

² See Harper, *Metaphys. of the School*, vol. 3, p. 35; Salmant. *De Euch.* Disp. 8, Dub. 5, n. 56; Joan. a. S. Thoma, *Cursus Phil. Nat. Q.* 12, a. 3, versus finem.

³ See Pesch, n. 628.

on the part of the creature, but not without an action on the part of God. They may have been kept from saying this expressly, out of reverence for the words of their Angelic Master in the treatise *De Potentia*, shutting their eyes to the passages I have quoted from the other portions of his works.¹

They are in precisely the same difficulty when they come to explain how sanctifying grace and the sacramental character can both be terms of the one physical motion of the Sacrament of Baptism. A form, even when it arises by natural resultance, must be the term of an action ; else there would be an effect without a cause. But the action whereby a substantial form is generated, cannot be the same as that which has produced the attenuated accidental disposition in the matter ; nor can habitual grace and a sacramental character be both a crystallization of the one motion. They are too different in their essence for that. Accordingly, nothing remains but to say that the substantial forms, however resultant, are produced immediately by divine activity, given, of course, the ultimate disposition to which each is con-naturally due.

¹ In this connection see by all means the account which Suarez gives of the difference of opinion among the Thomists as to whether between the accidental disposition and the substantial form there is a true action or resultance merely ; and if only the latter, how the substance is efficiently produced. *Metaphys. Disp. cit. Sec. 2, nn. 6-8 ; also Sec. 3, nn. 5 seqq.*

CHAPTER XIV.

ACTION AND MOTION.

IN the last four Chapters the reader will have seen the kinetic theory of activity at work, as it were. He will have observed, I hope, running through and supporting the whole system, the concept of action as a motion or flow of forms; the immediate agent or principle of activity being the form from which the motion proceeds; and the effect, that in which it finds its termination at any particular instant. And as, when a train stops at Maynooth on its way from Galway to Dublin, the station at Maynooth is the term of the journey already made, as well as the starting point of what remains to be travelled; so in the line of causation, each form reached successively is an effect in relation to the preceding action, and a principle or cause in relation to that which succeeds. The passive is thus continually becoming active, according to the axiom of Aristotle that action and being acted on (*passio*) are the self-same motion;—passivity preceding activity in the order of nature though not of time.

Now, the position of the Dynamists, as I understand it, is, that however this flow of forms may constitute passivity, it certainly is not true action, and therefore not true efficient and physical causality. This, accordingly, is the very heart of the question in dispute.

In the preceding Chapters I have given many reasons which seem to me to prove, in the first place, that the question is an open one among Catholics;—that Aristotle himself and the best of the Schoolmen advocated the kinetic theory, with certain deviations and incon-

sistencies due to mistaken notions of Physics ; and that not only have Dynamists no valid reason to urge in favour of their opinion, but, on the contrary, the progress being made in all branches of physical science is telling against them with ever-increasing force. I shall now conclude this portion of my argument by stating briefly what the most reliable Catholic writers have said with regard to the nature of action. It will thus appear whether they represent it as "a flow of forms," or rather as some sort of exercise of "force."

I.

A statement of the Catholic tradition on any point in Philosophy should naturally embrace what has been taught by St. Thomas. I feel, however, that having already so often referred to what he says of the nature of action, I may in this place spare myself and the reader the tedium of going once more over the same ground. I will merely remind you of two points out of many already touched upon:—First, that the definition of action as "a form in flux," adopted by me, is taken from the works of the Angelic Doctor;¹ and secondly, that he invariably represents action as the same thing as *passio*, both being really identified with motion.² How, I ask, can these two things be true, in accordance with the dynamic theory? Opponents complain of our reducing activity to mere passivity; but they *are* objectively the same thing in the philosophy of St. Thomas.

I. Passing over the Angelic Doctor, then, we come to Suarez, who will be accepted as being in the main a correct exponent of the views of one of the two great schools into which modern Catholic writers on Philosophy are

¹ See p. 290.

² See p. 57.

divided. There are, indeed, many points with regard to which the views of Suarez approach more nearly to those of the Thomists than to those commonly favoured by his brother Jesuits; yet, so far as I am aware, his brethren of the Society have no fault to find with his teaching on the point with which I am now dealing—the nature of action.

Suarez discusses the question in the 48th Disputation of his treatise on Metaphysics. In that Disputation he proposes the two following questions:—(a) “Whether action essentially denotes a relation to a *principle* of activity?” (b) “Whether, as action, it is essentially referred to some *term*, even though the action be of the kind known as immanent, so that it also should be placed in the category of action?”

Having answered both these questions in the affirmative, he proceeds to inquire:—(c) “Which of the two relations—that to the principle or that to the term—is the more essential to an action; and whence do actions draw their specifications?” (d) “Whether action, as such, essentially denotes a relation to a *subject of inhesion*; and which is this subject?”¹

To the last question he replies, that in so far as action is identified with *passio*, it implies a relation to the subject of its term; but in so far as it is distinguished from *passio*,—taken formally, that is, in the sense of action,—it has no subject of inhesion.²

¹ “Utrum actio essentialiter dicat respectum ad principium agendi” (Sec. I).—“Utrum actio, ut actio, essentialiter respiciat aliquem terminum, etiamsi immanens sit, ideoque etiam illa in hoc praedicamento collocetur” (Sec. II).—“Quis respectus, ad principium vel ad terminum, sit magis essentialis actioni, et unde sumat specificationem suam” (Sec. III).—“Utrum actio, ut actio, dicat essentialiter respectum ad subjectum inhaesionis, et quodnam illud sit” (Sec. IV).

² “Nulla actio ut actio, et praecise concepta sub ea ratione qua a passione distinguitur, habet subjectum inhaesionis sed denominationis tantum; unde, quae est in subjecto, solum inhaeret mediante passione.” Sec. IV. n. 15.

Having discussed these four questions at length, he finally asks directly: "What is the nature of action? What in things is the form or quasi-form by which they are said to act?" And replying to his own interrogatories he describes an action as follows:—

"It is *a certain mode of dependence*, of its nature distinct from the term produced. Applying the term *form* to this mode, we may say with truth, that action is the form by which an active principle is first reduced to act; or that it is *the form which flows first and of its own self*, and by which that which is truly produced emanates from and depends on the producer."¹

I do not say that this is a very lucid exposition of the nature of action; or that it is true in so far as it is intelligible; but I do say that it comes much nearer to the kinetic than to the dynamic theory of activity. To the mind of Suarez action essentially denotes a twofold *relation* to two realities known as the principle and the term of a motion. This relation is an entity existing midway between these two realities; it is described as "*a dependence* of the term on the principle."² Calling this relation of dependence by the name of form, it may be said to flow from the power of its own self. Is this language such as is used by dynamists, when they condescend to explain what they mean by their exercise of "force?" Are they prepared to admit that by the term

¹ "Quæ tandem sit actionis natura? . . . Quid in rebus est illa forma vel quasi forma per quam agere denominamur? . . . Explicuimus esse modum quemdam seu dependentiam ex natura rei distinctam a termino facto; atque hunc modum sub nomine formæ intelligendo, recte dicere possumus, actionem esse formam qua principium activum primo in actum reducitur, seu esse formam quæ primo et per seipsam fluit, et per quam id quod proprie fit ab agente manet ac pendet." Sec. 5, n. 1.

² See also Sec. 4, n. 13:—"De ratione actionis ut sic solum est ut sit modus quidam adhaerens termino et per se immediate fluens ab efficiente . . . est peculiaris modus constituendi ipsum terminum in rerum natura, dependentem et fluentem a suo principio."

“exercise of ‘force’” they understand merely a relation of dependence of one form on another?

2. In the next Disputation Suarez goes on to treat of *passio*, inquiring how it differs both from action and from motion. He begins by establishing the common teaching, that *passio* and action are not really but only virtually distinct. Then he proceeds to explain how this reality—*passio-actio*—is related to motion.

Now, it is quite plain that by motion all through this dissertation, Suarez understands true motion of every kind—continuous change from one positive term to another, change of place included. In one paragraph¹ he expressly urges as an objection to a portion of his own teaching, that it—the teaching—cannot apply to local motion; and he answers by showing how it does apply.

What kind, then, is the distinction which he advocates between *passio* and motion, local motion included? It is a distinction of a finer character altogether than exists between *passio* and action. All three are the same reality, which includes two things really distinct, “the form produced, and its dependence on the producer. Now, the form cannot be called the motion or *passio*, since it is the term of the motion; and if it were to remain alone—without a flux—it would not be motion at all. The same applies to action and to *passio*. It is, therefore, the flux or the dependence of the form, which receives all these denominations.”

“Now, the intellect,” he continues, “may conceive this flux in itself, as it is the way to a term, and abstracting from the fact that it affects some subject or emanates from some principle; and the flux so represented may be called motion. Under this aspect it is distinguished both from action and

¹ Sec. 2, n. 8.

from *passio*, and is in some sense included in both, either as something superior and transcendent, or as a material and inadequate concept of both."¹

The distinction drawn in this passage between action, *passio*, and motion,—local motion included,—is so fine as to be almost undiscernible,—we may say unintelligible. The writer goes on to point out two other ways in which the one reality may be regarded and spoken of as either action, *passio*, or motion; these additional distinctions being finer even than the first. It is to be remembered that all this time he has before his mind local motions as well as others.

It only remains to ask whether Dynamists are prepared to admit this teaching of Suarez;—that action and local motion are not really different, and can be distinguished only by the finest metaphysical precision. If so, I cannot see what fault they have to find with the kinetic theory.²

II.

Turning now to Goudin, as representing the second of the two great Schools of Catholic Philosophy, I find that he first quotes and explains the definition of motion

¹ "In termino aut forma quae fit in aliquo subjecto, tantum sunt duo in re distincta modaliter, seu ex natura rei, scil. forma ipsa quae inducitur, et dependentia ejus ab agente. Et forma quidem non dici potest motus ipse aut passio, . . quia forma est terminus motus, et quoad hoc eadem ratio est de actione et de passione. Itaque fluxus ipse seu dependentia formae est quae recipit has omnes denominationes. Potest ergo intellectus fluxum illum praecise considerare, ut est via ad terminum, abstrahendo praecise ab hoc quod afficiat aliquod subjectum vel manet ab aliquo principio, et fluxus ille ac conceptus potest motus appellari, et sub hac ratione conceptus ratione distinguitur tam ab actione quam a passione, et quodam modo in utraque includitur, vel tanquam quid superius et transcendens vel tanquam materialis et inadaequatus conceptus utriusque." Sec. 2, n. 14.

² I do not claim Suarez as a consistent advocate of kinetic principles. He does advocate them in these formal dissertations on action, *passio*, and motion; but in other places, as for instance to explain the production of substantial forms by created agents, he has recourse to "force."

given by Aristotle. After illustrating the definition by examples drawn from changes of quantity, heat (quality), and place, he goes on to say that motion may be either instantaneous or successive; and as an instance of the latter kind he refers to a journey;—"as a traveller reaches his journey's end at last."¹

In the third Article of the same Disputation, he discusses the conditions which should be found in the terms (*termini*) of every true successive motion; and having mentioned three, he illustrates them from the motion of a ship. "All these conditions are plainly to be seen in the motion of a ship that sails from France to America." Still further on he observes that the same part of a movable object may undergo contrary local motions at the same moment; and he illustrates this from the case of a person who is borne in one direction by a chariot or a boat, and who can move the parts of his own person in the opposite direction. He also refers to the case of the sun, which, according to the astronomical notions of the ancients, has a diurnal motion from east to west, without ceasing all the time to travel in its annual motion from west to east. There cannot be the least doubt, therefore, that Goudin includes local motion under the general term, motion, of which he professes to treat.

Now, the second assertion to which he formally commits himself is, that "motion, action, and *passio*, although they are the same in essence, nevertheless seem to be modally distinct. This is the common teaching of the Thomists."²

¹ Phys. pars. 1, D. 3, a. 1: Supra, p. 24.

² "Dico 2. Motus, Actio, et Passio, licet sint idem entitative, modaliter tamen videntur distingui. Conclusio est communis praecipue inter Thomistas." (Phys. P. 1 D. 3, a. 1). The reader will remember with what difficulty Suarez explains this modal distinction. See page 331.

Going on to explain and prove this statement, he writes :—

“The first part, viz., *that they are all three the same in essence, is manifest*. For, *the very same entity, heating*, for instance, as it is conceived to go out from the fire by way of diffusion of its heat, *is the action of the fire*; but as it is received in wood by way of change in the wood, it is called *the passio of the same*. Finally, in so far as it is a way or tendency to its term, that is, to [the quality of] heat, *it is called motion*. All three, therefore, are the same in essence. Hence St. Thomas often says that action and *passio* are but the one motion.”¹

Here again I ask : is not this a formal identification of action and local motion? Mind, I do not say that the motion of which Goudin treats does not include, as he conceives it, other kinds of motion besides that which is merely local. What I do say is, that under the general term, motion, local motion is included, and that he asserts of it what he says of motion in general. Now, he identifies all true motion with action and *passio*, illustrating his teaching from the movement of a ship, of the sun in its supposed orbit, of one who travels whether on land or sea; and expressly stating that every motion—these included—is in its essence the same as action. How does this fit in with the dynamic theory?

The observation just made with regard to the teaching of Goudin applies equally to all the Schoolmen. By motion they understand continuous change from form to form,—not merely from place to place, but from quantity to quantity, and from one quality to another.

¹ “Prima pars, quod scil. sunt idem entitative, patet. Nam una et eadem entitas, v.g., calefactio, prout concipitur egredi ab igne tanquam diffusio ejus caloris, est actio ignis; prout vero recipitur in ligno tanquam immutatio ligni, dicitur ejus passio; prout demum est via et tententia ad terminum, scil. ad calorem, dicitur motus; ergo ista omnia entitative sunt idem. Unde D. Thomas saepe dicit quod actio et passio sunt idem numero motus.” (l. c.) Compare the extract from St. Thomas at p. 290.

Hence they recognised three distinct species of motion, local movement being one of the three.¹ My contention is, that every one of these writers identified action with true motion of every kind; and as local motion was understood by them to be one of the species of true motion, it follows that they identified local motion and activity.

I do not at all wish to convey that they, any more than Goudin, did not recognise as true motion any other change than that of place. They distinctly held that true motion occurred between quantities and qualities. In this I am convinced they were perfectly right; for, as quantity and quality, though intimately connected with place, yet are not place, but form each a category perfectly distinct; so the flow of a quality, such as colour, from one shade to another, is an altogether different thing from the flow of the location of the coloured object. Change of colour, we know, depends on and is the result of change in the location of the particles of the coloured substance; but one thing may depend on another, although the two remain quite distinct.

The Schoolmen, at any rate, maintained most steadfastly that there are other forms of motion besides change of place. Nor does this interfere with my argument in the least. I contend that when they identify action with motion, they do not discriminate between one form of motion and another,—between change of place and change whether in quantity or quality. Now, there is hardly one of them who does not assert, after Aristotle and St. Thomas, that true motion of every kind is identical with action and *passio*. I fail to understand

¹ "Tria sunt genera motus, juxta tria prædicamenta quæ terminant motum. Primum genus est motus ad quantitatem. Secundum genus est motus ad qualitatem, quæ dicitur alteratio. Tertium genus est motus ad ubi, quæ dicitur latio." (Goudin l.c.; a. 4, dico 1: *supra*, p. 1).

how this is to be reconciled with the dynamic theory, which makes activity consist not in motion of any kind, but in an exercise of "force."

NOTE TO CHAPTER XIII.

IS TRANSUBSTANTIATION AN ACTION?

IN connection with the last three Chapters I would like to call attention to a matter which has given rise to no little controversy among our theologians;—viz. whether the conversion of bread into the Body and Blood of Christ is a true action. It might seem at first sight as if no one could deny that an action is required to place the Humanity of Christ under the sacramental species; for, is not this presence an effect, requiring a cause? Yet it has been denied by at least one eminent theologian, Vasquez (In 3 p., D. 181, c. 11); and those who have attempted to discuss the point after him, have proved one thing, at least,—that their ideas regarding the nature and the object or term of activity are not of the most lucid kind.

The difficulty seems to have arisen from some observations made by St. Thomas in his *Commentary on the Sentences* (4. D. 11, q. 1, a. 3, q1a. 1, ad. 1, 3), and elsewhere; in which, as it seems to me, he teaches that there can be no true motion between the substance of bread and the Body of Christ, since there is no continuity between the two; and hence whatever action there is cannot proceed immediately from the bread. This doctrine ought not to present any difficulty.

Not bearing in mind, however, that as he considered action to be merely a continuous flow from form to form, it was natural for St. Thomas to inquire whether in Transubstantiation there is such a flow from the bread into the Body

of Christ ;—not bearing this in mind, Vasquez seems to have understood the holy Doctor as excluding not merely an action on the part of the bread, but on the part of any agent whatever,—even of God Himself.

It is almost unintelligible, at first sight, how the controversy could have arisen at all ; but it becomes quite intelligible when one bears in mind what St. Thomas's notion of activity was ; how natural it was for him, as a consequence, to guard against attributing to the consecrated elements the activity of change ; and how it is no less natural for one whose notion of activity is dynamical, to fail of understanding what was in the mind of the holy Doctor. See on this curious question, besides Vasquez l. c. ; Suarez, *De Euch.* D. 50 ; De Lugo, *De Euch.* D. 7 ; Salm. *De Euch.* D. 5, Dub. 2.

CHAPTER XV.

VITAL ACTIONS.

ADVOCATES of the dynamic theory are wont to rely very much on an argument or cluster of arguments which they derive from a consideration of vital actions and principles. "Consciousness testifies," writes Fr. Pesch, "that we ourselves exercise a certain activity, as when we turn our mind to think of this or that, when we put forth an effort for the purpose of raising or moving an object, or when we elicit an act of the will. Hence, (a) the principle of those who reduce *everything* to passive motion, collapses; and (b) it is easy to conclude that a similar activity is required to produce like effects in external nature."¹

I have already protested against the way in which the kinetic theory is misrepresented in passages like this. No one, as far as I am aware, wants to "reduce *everything*" to passive motion." Not I certainly. Why, even the most advanced Materialists insist that one thing at least—matter—is altogether different from motion. And what advocate of the kinetic theory ever thought of motion or action as being *merely* passive? The very essence of the theory, on the contrary, is, that motion is both passive and active,—that, as Aristotle

¹ "Teste sensu intimo nos ipsi quandam activitatem exercemus, ut cum animum convertimus ad cogitandum hoc vel illud, cum nimum quemdam adhibemus ad tollendam vel movendam rem, aut cum actum volendi elicimus. Unde (a) ruit principium adversariorum, qui *omnia* ad motum passivum revocari volunt; (b) facilis est conclusio, ad similes effectus in natura extranea producendos, similem requiri efficientiam." (*Inst. Phil. Nat.* n. 61).

² This word is underlined by Fr. Pesch.

and St. Thomas put it, *passio* and action are the very same reality.

Coming now to Fr. Pesch's argument, what do we find? "We ourselves exercise a certain activity when we think, will, or put forth an effort for the purpose of moving an external object." Who denies it? What has to be proved is, that the activity or effort thus exercised is anything more than the motion of a faculty,—anything of the nature of what is called "force." Of this, which is the precise and only point at issue, I see not even an attempt at proof made by Fr. Pesch.

There are some, I admit, who think that when they are engaged in the exercise of any mental or muscular faculty, they are conscious of "forces" within them, distinct from and productive of their motions. It seems to them, moreover, as if in the absence of such "forces" all vital action were impossible. For, whilst mechanical movements are caused by external agents, vital actions arise spontaneously within the living organism or faculty. But it is impossible that this spontaneity should be so perfect as to exclude all causality; hence there must be something capable of producing even spontaneous actions, and "force" is the only agent that can be conceived capable of producing them. When it has been proved that this agent exists in case of vital actions, it is not unreasonable to look to it for an explanation of mechanical motions as well.

In the argument thus outlined there is some show of reason; and inasmuch as the subject is interesting in itself, and throws light on the whole question on which we are engaged,—the nature of activity,—I hope it will not be deemed irrelevant if I preface my reply by a statement as to the nature of vital actions and how they are produced.

I.

There are two tests by which vital movements may be distinguished from those which are merely mechanical,—spontaneity and immanence. Vital motions are not infused from without, that is, from any other creature in which they previously existed; they begin to exist for the first time within the vital organ or faculty in which they are subjected. Moreover, they never pass from one subject to another.

Both of these characteristics are not of equal importance, according to the Philosophy of the School. It is the universally received teaching that spontaneity is of the essence of vital activity. It is not so with regard to immanence; for, according to some of the ablest of the Schoolmen, vital actions may be transient,—that is, may pass from subject to subject; as when, in writing, motion passes from the hand into the pen. The more common and better opinion, however, is, that vital movements are as immanent as they are spontaneous; with this difference, that the latter quality is of the *essence* of vital activity, whereas the former—immanence—is not *essential* but only what is called *proper* to the same. Essential qualities are prior to and more fundamental than properties; as, for example, in the case of the human soul, spirituality is of its essence, whilst the capacity of acquiring knowledge is a property naturally flowing from the essential spirituality.¹

¹ "Duo constanter in viventibus inveniuntur: lum, quod se moveant per principium sibi intrinsecum; zum, quod actio vitalis non sit transiens sed immanens in ipso vivente ipsumque perficiens. . . Dico, ergo, quod conceptus essentialis vitae consistit in eo quod vivens se movet a principio intrinseco, quod est in ipso, et quod animam appellavimus; immanentia vero actionis est quid secundarium, consequens ut proprietas vitalis, eo ferme modo quo capacitas sciendi sequitur rationalitatem." Zigliara, Psych. i. iii.

As this Essay is intended primarily for Catholics, all of whom admit that vital actions are essentially spontaneous, it is not necessary for me to give any proof of the doctrine. It is, however, very important for us to understand what precisely this spontaneity is and how far it extends.

I have already described spontaneous actions as those which are not infused from without; by which I mean that they begin to exist for the first time within the organism or faculty in which they are subjected. A Dynamist would naturally object to this description as implying that mechanical, transient motions pass from subject to subject. Hence, in conformity with the dynamic theory, a vital movement might be defined as one which is caused, not by an external agent, but by the innate "force" or power of the subject in which the motion resides. This definition would then be recommended as being traditional in the Catholic schools; in which, since the time of St. Thomas and before it, living beings have been represented as those "which move themselves."¹

Now, it seems to me that both of these definitions are true in a certain sense, and are, so far, reconcilable with each other; whilst it is no less true that each of them is capable of a meaning which is absolutely false.

1. In the first place the definition of the Dynamists might be understood as conveying that living beings have within themselves the *adequate* power of initiating motion, without being pre-moved by any agent whatever. Living things are defined to be "those which move themselves;" therefore, they do not require to be moved by another. They are represented as having within them

¹ "Illa proprie sunt viventia quae seipsa secundum aliquam speciem motus movent." 1, q. 18, a. 1.

a "force" whereby they may generate actions ; what need, then, of the assistance of any other agent ?

Now, nothing could be more foreign to the mind of St. Thomas and the Catholic Philosophers than the supposition that any creature, no matter how vital or full of innate "force," can move itself independently of at least the divine co-operation. Not the smallest stir can it make unless God assists it to move.

Moreover, in seeking for the reason on which this doctrine of divine co-operation is based, we find that the innate force of living beings, whereby they are said to be able to move themselves spontaneously, is, to the mind of St. Thomas and his disciples, a very different thing from the "force" of the Dynamists. If I have not completely failed to apprehend the meaning of the latter, the "force" they advocate is not passive in any sense. It may not be able to act unless on certain conditions ; but, these being present, it is at once active, without needing to receive. The very contrary is the teaching of the Thomists.

If there is anything characteristic of their system of Philosophy, it is the doctrine of physical premotion ;—that no creature, animate or inanimate, can make the least move without being made to move by a previous physical action on the part of God. But, is not premotion on the part of God the correlative of passivity on the part of the creature ? The creature must be moved before it can move ; how does this fit in with the Dynamists' theory of innate "force" ? or of things vital being able to move themselves without being moved from without ? If things have this vital "force," why can they not move without being previously moved by God ?

It is most necessary for a Catholic to be on his guard against ascribing to creatures, animate or inanimate, any "force" whereby they would be made

independent of God ; or by reason of which they would depend on Him mediately but not immediately for their actions ;—anything that would do away with the necessity of physical divine premotion. This must be carefully borne in mind especially by those who define living creatures as “those which move themselves.” They are, indeed, self-moving, as far as other creatures are concerned, but not by any means in their relation to God : they are not utterly self-moving. This is almost a dogma of Catholic faith.

Of course there are many Catholic Dynamists who deny the doctrine of the physical premotion of vital actions by God ; but even these do not go so far as to assert that creatures are able to do more than *contribute* to their own movements out of their vital “force.” Living things move themselves, not of their own “force” only, but with the co-operation of God. Vital actions are caused from without by God ; but they are no less caused from within by the energy of the creature. This is what may be called the recognised theory of the Jesuit schools.

I have already pointed out the danger to which this doctrine exposes its advocates. Why is God’s concurrence necessary at all? There are only too many nowadays on the look out for some pretext for thrusting the Creator out of the world : how are we to convince them or even ourselves that “we live, move, and have our being, in Him?” Of course there is the Catholic tradition ; but there is even a stronger tradition with regard to God’s existence ; yet how necessary it is for us to be able to prove scientifically that He does exist.

Nothing could be more dangerous in this materialistic age than a principle the natural tendency of which is to make us independent of God,—to enable us to ignore His presence and the necessity of His Providence. And

if creatures are endowed with "force" whereby they may "co-operate" in the production of their actions ; it seems to me that there is not the least proof that the divine co-operation is necessary for the production of the same.

The argument which Liberatore has drawn from St. Thomas in proof of the necessity of immediate divine co-operation, seems to me the only conclusive demonstration of this fundamental doctrine. We may vary the form of the argument, but in every shape it remains essentially the same. Created things, even when fully equipped for action, filled with vital energy as much as may be, yet have no actual action until they actually begin to act. When, therefore, they do act actually, their perfection is increased ; they have now what they had not before,—an action. How did they get this increase of perfection ?

Liberatore tells us, what is manifestly true, that no being can give itself what it has not got to give,—can make itself richer in reality by the amount of an act or of anything else. Hence, as our fully-equipped creature, however much of energy it may possess, yet lacks all action until it actually begins to act ; it manifestly cannot give to itself what it has not, an action, or even the least particle of an action. Some other agent must give it whatever of action it acquires ; and, as vital actions do not come from any other creature, it follows that each must be infused into the faculty by God. I see not the least flaw in this line of reasoning ; at once it compels assent.¹

But when the philosophers who reason thus turn round and tell us that there is a mistake in the premisses ; that a being may give to itself something which it had

¹ See the Latin text of this argument of Liberatore's at p. 96.

not actually, provided it had it virtually, at least,—that is, had the power of producing or acquiring it; and that, accordingly, living creatures may “co-operate” with God in producing their own movements, inasmuch as before the movement commences they are endowed with “force,” which is a power of moving themselves;—when I hear this, I know not what to think. If “force” enables creatures to “co-operate” in the production of motions which they had not,—to “contribute” to their own increase,—why may it not make them capable of moving all alone? Because, you reply, no being can give itself what it had not. I fail to see how it may not *give* as easily as *co-operate* or contribute. What is co-operation or contribution but giving? Thus the argument which seemed so convincing is robbed of all its force.

This doctrine of immediate divine co-operation in all our actions is fundamental in the Catholic system; and it is almost of equal importance that we should be able to prove it from reason alone. One of the most serious charges against the dynamic theory is, that it robs us of all proof from reason of this great fundamental truth; and that it does so in flagrant contradiction of one of the most elementary principles of science,—that nothing can give in whole or in part what, antecedently to the giving, it had not in the least degree. It is no doubt very necessary to avoid Occasionalism; but it is no less necessary to be on one’s guard against principles which in the natural order develop into a rejection of Providence, and in the supernatural into a denial of Grace.

Coming back to our definition of living things,—they “move themselves,” undoubtedly, but only when and in so far as they have been previously moved by God: the meaning of which is, that their vital powers enable

them to receive the divine premotion, and to hold the same and transmit it from instant to instant within themselves, as long as God is good enough to continue His communication. The creature, no matter how replete with vital energy, has, when at rest, only the power of receiving the divine premotion; it has no actual movement which it can, as it were, transmit to itself, so as to endow itself with action. While the movement continues, it can have at any instant but what it received from the instant previous; which, by going back to the first instant of all, is proved to be precisely what it received from God.

Accordingly, though it is true in a sense that vital actions arise spontaneously within the vital faculty, which thus may be said to move itself; it is not true that these movements are independent of the divine premotion. From this point of view it is more correct to conceive vital actions as being spontaneous, in the sense that they do not pass into the faculty from any other creature,—that they never existed in any other subject, but were produced by God for the first time in the faculty wherein they are said to arise. Living things, therefore, are those which “move themselves,” or are moved independently of any external *created* cause from which their movements may proceed; but not independently of a previous action on the part of God, whereby these spontaneous motions are excited within the vital faculties.

2. Turning now to the other form of the definition, according to which vital actions are those which begin to exist for the first time within the faculty in which they are subjected; it will be seen almost at once how easily this might be misunderstood. For, God may take any piece of inanimate matter and cause it to move of His

own immediate action, without the intervention of any created agency. In that case, a mere mechanical motion would exist for the first time in the object which is supposed to be moved by divine intervention. As a matter of fact, all the mechanical motion of the universe must have been caused thus in the beginning by the action of the Prime Mover. And ever since, whenever miracles have occurred in the inorganic world, or when, without miracle, in response to prayer or otherwise, the Creator has imperceptibly intervened to change the motions of matter,—causing rain or sunshine, or giving medicine a special efficacy ;—His intervention has taken the shape of a motion existing for the first time in some portion of matter ; which motion, however, no one would think of regarding as vital or spontaneous.

Remark, now, the difference between the mechanical movements produced in this extraordinary manner and the motions which God is infusing every moment into the vital faculties of living beings. The difference is in the *quality of the motion* which is incited or infused. When, in the instant after creation, God put matter into motion, its movements were just of such a character as might have been caused by a moving body already in existence, if such there had been. The motion was caused immediately by God, because there was no other agent to produce it ; in itself it was such as might have been produced by a much lower agent. Similarly, if God were to move a billiard-ball over a table from a state of rest, the motion of the ball would be in its nature precisely the same as if it came from a cue.

It is not so in the case of vital actions ; these are in themselves of such a character as must come immediately from God. Those which are naturally infused by other creatures are not vital but merely mechanical. When, therefore, we define a vital action as one which begins

to exist for the first time within the faculty in which it is subjected, we take into account what happens according to the natural course of divine Providence. Mechanical motions may be and often are excited in a similar manner ; this, however, is *per accidens* not *per se*. As far as they themselves are concerned, they might have come from outside ; whereas vital actions of their own nature require to begin within the vital faculty.

It will be seen, thus, that both definitions of vital movement are open to misconception ; also that, when properly understood, each is quite correct. I prefer the form most opposed to the materialistic tendency of modern science, which is to ignore the action of God in His creatures. I believe there is less danger for us in conceiving vital actions as beginning within the faculty, than in representing them as the result of the movement of the faculty itself ; especially when, as a matter of fact, no matter how vital an action may be, in its first instant it must be produced by God alone.

II.

Bearing in mind this explanation of what is meant by the spontaneity of vital actions, the reader should have little difficulty in answering the objections to the kinetic theory which were proposed at the beginning of this Chapter. We have no "force" except faculties and their motions. Everyone, of course, must be the judge of his own consciousness ; for my part, I do not feel conscious of any other "force." I feel my actions, my movements,—when I think, will, or endeavour to raise an object ; but as for a distinct reality, such as "force," I do not feel any such thing.

Analyse what you feel in cases of muscular effort ; as in an attempt, successful or unsuccessful, to raise a heavy

object. It seems to me that what I feel is a contraction of the muscles, a pressure of cell upon cell, communicated in every tiniest portion of the arm from the muscle to the nerve and *vice versa*. Thus are produced a confused mass of very minute sensations, which being continued long enough end in pain. What are all these but motions, akin to what happens when I receive a blow?

It is open to question whether consciousness testifies to anything within us more than an action or motion. The common teaching of the Catholic philosophers seems to be, that it reveals to us ourselves, indirectly and *per accidens*, however. But how much of ourselves does it reveal? Our faculties? All our faculties, first the passive, then the active? It seems to me very difficult to determine where sense-perception terminates and intelligence begins, especially in this region. A man may thus easily persuade himself that he feels a "force" present within him, when he *feels* but a motion, and *concludes* that it is the result of a "force." If we were not told of God's premotion, it would be easy for us to convince ourselves in the same way, that all our actions are produced by ourselves alone. It is admitted that we feel certain motions within us; but it is not admitted that we are conscious of realities distinct from motions and their subject faculties,—of "forces," from which, as Dynamists have persuaded themselves, these movements take their rise.

The second characteristic of vital activity—immanence—is of importance in our controversies with Materialists, a careful consideration of it, however, cannot fail to make us cautious about relying overmuch on the testimony of consciousness in the matter. Not, of course, that consciousness is untrustworthy when it gives a clear testimony; but rather that in our partisanship we are often disposed to take as coming from consciousness what is not its testimony at all.

It has been already observed that some of the ablest of the Schoolmen do not regard immanence as a property of every vital action. According to Suarez, for instance, though every immanent action is of its nature vital, the contrary is not true, inasmuch as there are many vital movements which are by no means immanent.¹ Indeed, he goes so far as to assert that it is only purely spiritual actions that are truly immanent, the movements of organisms being called immanent only in a loose and improper sense.² In this connection he expressly mentions the motions which take place in nutrition, growth, and the local movements of animals; and in another place³ he calls attention to the transient character of the action of talking and of playing on the harp.

And, really, there would seem to be a good deal in this contention; more even than Suarez would allow. For, conceive the case of a man who throws an object into pure space:—it is quite plain that the case is not absolutely impossible. Here we have two actions,—the motion of the man's arm, and the motion of the object thrown. If asked to distinguish between them, it is natural to say that the motion of the arm is vital, whereas the movement of the object is purely mechanical. And yet the former seems to have passed from the arm to the missile; whereas the motion of the missile must remain within its subject, until it finds another into which it may pass. Being in pure space this contingency may be conceived

¹ "Non est contra rationem actus vitalis quod sit transiens; . . . nam licet omnis actio immanens vitalis sit, non videtur necessarium ut e converso omnis actus vitalis sit immanens." *De Anima*, L. 1, c. 4, n. 13.

² "Immanens proprie tantum illa dicitur quae formaliter manet in eadem potentia proxima a qua elicitur, quaeque ex suo genere talis est ut nunquam in alio subjecto fieri possit; et hoc modo tantum actiones cognoscendi et amandi sunt immanentes." *Metaph.* D. 48, S. 6, n. 9.

³ *D.* 48, S. 2, n. 21.

never to occur ;—if, for instance, the object were made to revolve for ever in a circle. In this case, therefore, we seem to have what even Suarez did not contemplate,—an immanent action which is not vital ; as well as what he contended for,—an action which is vital, though passing into another subject.

Examining the matter a little more closely, we perceive that the motion communicated to and subsisting in a missile, which is supposed to be thrown into pure space by a human arm, is really immanent, but only *per accidens*. It is transient *per se* ; it remains in its present subject only so long as this does not come into contact with another. Should a collision take place, the motion in itself is of such a character, that it will surely pass from the missile to the object against which it strikes. In the case proposed, therefore, although the motion does not actually pass, it is of its nature such as may pass at any moment ; and this is what is really meant by a transient motion or action.

Turning now to the action of the thrower, it seems to me to be partly immanent and partly transient ; and I should say, moreover, that in so far as it is immanent, it is vital ; whereas it is purely mechanical in so far as it passes from the arm into the object thrown. If this be true, it will suggest the necessity of very great caution in estimating what precisely is the testimony of consciousness in this matter ; as, apparently, nothing could be more directly the object of the inner sense than that the motion necessary for muscular effort, such as stone-throwing, is altogether vital,—arising spontaneously in its entirety within the arm of the thrower.

In support of my contention,—that muscular movements, such as those of a slinger, are not wholly vital, but in part mechanical,—I would ask you to attend to the waste that results from every action of the body,

also to consider why a supply of food should be necessary for maintaining vital activity. Physiology tells us that the slightest muscular or nervous movement results in waste,—in a decomposition of the living substance and formation of dead matter. To make up for this, there is a process of nutrition or growth,—a decomposition of dead matter and production of living tissue. According as the waste or the nutrition preponderates, the organism grows weak or strong ; and should the waste continue whilst there is no growth,—because, for instance, there is no food-supply,—then the energy within the organism is soon exhausted, life itself ceases, and even the dead remains are resolved into the elements from which they came.

Here, then, is transiency of the most decided character ;—of the food into the blood, and thence into the organs, which in their turn produce waste by every motion ; the matter thus given off being quite inanimate, to be acted on by means of transient actions, like any other machine. The food communicates its motions to the stomach, thence they pass into the blood, thence into the organs, from which they issue in many forms of waste.

You may say that it is matter that is thus communicated, and not motion ; as is proved by the fact of the organism increasing or diminishing in bulk. I do not deny the communication of matter, but contend that motion also passes in these various changes. There is, at least, a communication of energy, which must be either kinetic or potential ; and I do not know in what potential energy can consist, unless it be in its essence kinetic. In cases of nutrition and growth it is a form of cohesion ; and cohesion, as we have seen, is in all probability due to pressure—that is, motion—from outside.

It is not only matter, then, but motion also that passes

into the living organism, remaining there in the shape of tiny cohesive movements, which unite again and pass off in one large stream, when muscular effort is exerted as in the throwing of a stone. The motions which pass thus out of the system, are as purely mechanical as the movements of a steam-engine. You throw food into the stomach of the machine,—the furnace,—and all the tiny sun-motions locked up in the fuel in the form of cohesion and chemical affinity, are converted into heat. These passing into the water turn it into steam. Thence there issues one grand stream of movement, which flows into the wheels of the locomotive, into the atmosphere, into the earth ; very often resulting in decomposition of matter, and the re-formation of other cohesions. So far, I see no difference between the organism and the machine.

In what, then, do they differ? For, surely, there is something in a living animal more than is to be found in a steam-engine. The difference between the two seems to me to consist in this, that the motions of a mere machine are *all* transient in their nature ; whereas in living organisms there are, in addition, *other* movements which do not pass at all. It is these and these only which I should consider vital actions.

Take the illustration of the slinger. In his arm there are two sets of movements ; one consisting of such as are purely mechanical, issuing from the arm as they entered it, just as they might issue from or enter into a mere machine. But with these, directing them and guiding them, there is another set of motions. These do not pass from the arm into the missile, as they did not enter into the arm from the food. They begin within the organ as they end there, merely causing a change in its form, in its quality, in the arrangement of its parts, in its relation to place. These are the true vital

movements, having their term altogether within the faculty or organism. Hence, every action which is truly vital is immanent as well.

III.

Materialists ask for proof of the existence of these immanent, vital movements ; contending that they have never been able to experience any such. Science knows not of them. All her experiments go to show that in the animal, as in the steam-engine, the amount of work done is exactly equal to the amount of energy supplied and not yet exhausted. The most powerful microscopes, the most delicate balances, have been brought to bear on living organisms of all kinds, for the purpose of ascertaining the existence of these motions and measuring their intensity ; but not a trace was ever left on an instrument, unless by what is known to have entered the organism from other creatures. Hence, many scientific men refuse to admit the existence of these spontaneous and immanent motions.

But, pray, how could such actions be detected by the most delicate of instruments, if, of their very nature, the actions are incapable of affecting any external thing ? We say that they are altogether immanent,—producing no effect whatever except within the organism ; and we are asked, forsooth, to believe that it cannot be so, because these altogether immanent actions do not tell on a microscope or a balance ! Why, if they did tell, they could not be vital or immanent at all. Is it not foolish, then, for a man of science to have recourse to mechanical instruments in this investigation ?

To what, then, are we to have recourse ? Surely we can have no knowledge, even according to the Schoolmen, unless of what comes to us through the senses.

And if vital actions do not tell on the senses, causing sensations, how is one to come to a knowledge of their existence? If they remain always hidden, each within its little organism or spiritual faculty, how did any one ever succeed in ascertaining that there are any such?

The answer is, that each one is conscious of certain of his own vital motions; those which exist within the organs of sense-perception are revealed by an inner sense. All but utter sceptics acknowledge that we may, through consciousness, be certain of many sense-motions existing within us. Why, I ask, should it be necessary, to effect this consciousness, that the motion should have come from without—from food,—or should pass as waste from the organ after its work is done therein?

We have, of course, no consciousness of the motions of others, and there are many of our own actions which we do not perceive. Besides consciousness, however, we have other means of information; above all, we have intelligence on which to rely. By this faculty we perceive substances, even material substances; by it we reflect on motions and qualities of all kinds, penetrating not only to what is connected with them, but to their very essence. If we may be certain of the existence of substance, of matter underneath motion,—and what scientific men believes in nothing but motion alone?—why may we not be able to perceive one motion connected with and directing another, though the former might, of itself, be unable to affect an organ of sense? Is matter, of itself, able to affect our senses? Is it not by its motions only that its existence has been revealed?

Here, then, we take our stand. Materialists, of course, deny that we have any faculty of intelligence; we appeal to their own belief in matter, to their own consciousness of power to direct their actions, to common sense. Animals are not mere gas-engines; there is a manifest

difference between the locomotive and the man in charge ; the machine is controlled by the man, who is self-controlled. We appeal to all nature to testify whether there is not a whole world of difference between the animate and the inanimate ; and we defy any one to point out any other difference but what is here assigned.

Take a survey of the universe in a spirit of honesty, and ask yourself whether you can be content to reduce all things to one dead level of mere iron machinery. Go out into the fields in spring-time, and observe the revival and growth of the vegetable world. Mark the insects, fishes, birds, with their tumultuous strivings, perceptions, instincts, passions, appetites. What a mastery they have over their movements ! How free they are ! Dive into the haunts of men, and ponder well their struggles, defeats, conquests ; their lofty sciences, solemn religious perceptions, appeals, sacrifices ; and be satisfied, if you can, with the theory that all these individuals are like the wheels of a locomotive,—moving only as they are moved by mechanical forces playing on them from without.

Compare their motions with those of other objects—objects which we know to be inanimate,—with the movements of the planets in their courses, of the winds and waves, of ships and railway trains. You cannot fail to observe, as did Aristotle long ago, how fire grows with what might seem to be spontaneous motion ; while it is active, you speak of the *live* coals, and when it smoulders, you say it is *dying*. You sit by a well, and watch the bubbling, the flow, the sparkle of the waters ; and are not surprised that men should associate life with them,—“the *living* waters.” If you have a taste for chemistry, you can arrange for the *growth* of minerals ; and in any case you can hardly fail to be struck by the curious forms assumed by liquids in the process of

crystallization, as when water flowers into ice on a window-pane. All through this your strong common-sense will not permit you to be the victim of associations; you cannot doubt for a moment that all these substances are inanimate, that all their motions pass from one into the other. And having resisted all these evidences of self-motion, you, the strong man, with no illusions, find yourself overpowered by the beauty of a flower, or the light in an insect's eye, or the easy poise of a falcon on the wing, the flash of a trout in the stream, or more than all by the aspect of a human being in study or in prayer. I say it is rational to trust our nature, and not hesitate to commit ourselves to what we, who resist so many illusions, find ourselves utterly unable to withstand.

I know it will be said that this involves the principle of specific differences,—a principle which no one with any pretensions to scientific culture any longer dares to mention in the schools. This will be said especially by a number of second or third-rate scientists,—the flock that always follow without consideration, where the rashest and most unscrupulous of their leaders show the way. They never reflect that specific difference is of the very essence of science. If there were no such thing as specific difference, what would become of their favourites, matter and motion? They are wont to tell us that whatever is unthinkable is untrue; who, then, can think of motion where there is nothing to be moved? And if there is anything to be moved, it is not motion, but something specifically distinct,—else it were of no avail as a help to one's thought. Here, then, we have on their own admission the very principle of specific difference which Materialists so much abhor.

Difference of species lies at the very threshold of physical science, as of all science; the only question

being, how far does the difference extend. This must be ascertained by induction,—the process by means of which we have arrived at so many other universal truths. It is plain, indeed, that in this process we are liable to error,—liable especially to conclude universally before a sufficient number of individuals have been examined. To undue haste of this kind are to be ascribed the mistakes made by scientists in every age.

What, however, is one to do? Can we not be certain of the universality of the laws of gravitation until we have made experiments on all the cases that may possibly occur? What if some sceptic were to suggest that possibly next year or next week the Atlantic Ocean will not bear ships upon its waters; or that the material used in railways may not stand the usual strain; or that the food which was found wholesome hitherto, may prove poisonous in future? What should we think of one who would allow fears such as these to keep him from travelling or from taking food?

Of course one must draw somewhere the line which separates certainty from probability, this again from what may be called suspicion, and suspicion itself from blank nescience. The line, which must be drawn somewhere, should be actually drawn as intelligence and prudence may direct. The danger most to be avoided is pusillanimity,—the condition of those whose fear of error is so great as to render them incapable of anything like firmness of assent. What dogma of science is so clear as to exclude possibility of doubt, if one were morbidly to continue reflecting on the mysteries with which it is surrounded? Motion itself, sense-perception, consciousness,—are they not all compassed on every side by obscurity? Must a prudent man refuse to believe in them, until he has cleared away every mist of suspicion? Is the duty of scepticism itself quite free

from difficulty? By excess of caution it is quite possible to overreach oneself, and drop into the very pitfall one is most anxious to avoid.

There is danger in assenting with undue haste; but is there none in refusing to assent until every most accidental obscurity has been removed? The passion for detail has taken such hold of scientists nowadays, that if their common-sense did not compel them to act in contradiction to their principles, they would not admit the existence of the sun in heaven, until they had cleared up every difficulty about the spots on its surface, or about the force whereby it is poised in space. Does science require all this caution? Must not a scientific man, if he is to know anything, be content with such details as prudence considers possible for him under the circumstances? It is the office of this virtue (*providentia*) to forecast the dangers that beset all the courses that are open to one,—the danger of utter inactivity being one of the greatest of all. Better to fall into error occasionally than to refrain from ever giving assent for fear lest by any possibility one should be afterwards proved to have been led astray.

Of course men have erred in this very matter; and, no doubt, some differences which are now deemed specific, as science progresses, will be found not to be so at all. But where is the doctrine of which the same may not be said? By all means let us be cautious about filling in details; let us even dare to admit that some of what we are accustomed to call our intuitions may be mistaken notions. But human nature rises up in protest against the doctrine that would have us doubt of *everything* in regard to which we are exposed to a possibility of error; and among the most primary and fundamental and intuitive perceptions of our nature, is this of the specific difference between animate and inanimate things.

IV

There is one point in connection with the vital motions of organisms, to which, before concluding this Chapter, I would call the reader's attention. It seems very strange that there should be in a body any motion which is unable to pass from subject to subject. It would seem as if, when a living organism in motion comes into contact with another body, all the motion of the organism, vital as well as mechanical, or, at least, some part of each species, must necessarily pass into the object of contact. For, be it remembered, this object is impenetrable, and occupies a place towards which the organism is supposed to be moving. Accordingly, when it is borne in mind that we are everywhere packed round and wedged in with matter on all sides ; with ether, above all, which penetrates into every crevice of our system ; it will seem to follow of necessity that the very slightest motion of the smallest cell—and vital action is true motion—must send waves undulating in all directions. Thus, for instance, the substance of the eye is in almost continuous contact with the ether in which it is immersed ; how can it stir in any direction, whether vitally or mechanically, unless by displacing some of the ether from the place into which it moves ? The displacement may be slight, but it will be there. The eye in seeing would thus seem to agitate the depths of the great ocean of ether, as surely as birds on the wing beat the air in their flight, or as the fins of a fish displace the waters of the sea.

Of course it is possible to conceive a case in which the living thing may be supposed to be surrounded by pure space. In such a hypothesis, were it to move an organ, the motion could not pass, for want of something to pass into. This, however, is quite *per accidens*, and

is true of stones as much as of living things. *Per se*, both vital and mechanical motions would seem to be able to pass.

Reflecting on this argument, I am not at all surprised that Suarez should have denied the immanence of the vital motions of organisms. With all the progress made by Physics and Chemistry since his time, it is not at all easy to be sure that one sees exactly how our bodily actions can be immanent in the circumstances in which we live and move. Hence I should not be in the least surprised if the explanation which I am about to suggest were by many considered unsatisfactory.

1. In the first place, it does not seem to me at all certain that a living organism could naturally move, or even exist, in pure space;—that, for instance, without any special aid, a man could play billiards if there were nothing in existence but himself, the table, and the balls. It has been already stated that the motion of a billiard-player's arm is partly mechanical and partly vital,—the mechanical motions being the chemical affinities which existed in the food he ate and in the air he breathed. If there were no chemical affinities or cohesions, what would be the effect on the player, on the table, on the balls? What a paralysis would ensue in the arm! How the balls would resolve themselves into the most attenuated gas! And yet, if chemical attractions and cohesions are but pushes of some kind, it is easy to see, that as there could be no push except through the instrumentality of a substance in contact, just as there could be no sun-light if the ether were removed, so there could be no chemical attraction, and consequently no muscular effort, in one who is compassed altogether by space absolutely pure. And if God were to interfere and supply these affinities, the result would be chemical motions in the arm. These chemical motions thus supplied

might pass into the balls, but the vital actions by which they are directed would remain in the arm as in the purely natural state.¹

I do not wish to be understood as committing myself definitely to the foregoing suggestions. It does seem strange that a living organism should be unable to move until it has received an impression from without. This, nevertheless, seems to be a law of nature : we cannot have the least perception, or appetite, or motion of any kind, whether in the sensitive part or in the spiritual, until some impression has been received. And, even though such an impression were spontaneously made by God, but no mechanical motion continued, it is not at all so clear that the vital action so occasioned would con-naturally continue to exist. The one function of life in matter seems to be to direct the mechanical motions of the subject. If there were no mechanical movement, that one function would become impossible, and the natural result would be the cessation of the vital act. If this be true there is always a mechanical motion wherever there is a vital action in matter ; and, so, whenever an organ acts vitally, there is within it a motion such as may be transmitted to the bodies with which it may be in contact. We have seen how, as a matter of fact, mechanical motion is transmitted from the arm of a slinger to the missile which he throws.

2. Suppose, however, that vital action could exist in bodies unaccompanied by mechanical motion, somewhat as it exists in angels and disembodied souls, does it follow that it should pass from the organ in which it is subjected into any body with which the organ may be brought into contact ;—for instance, from the arm of a billiard-player into the cue ? It will be seen at once that

¹ See page 261.

the motion could not pass unless the cue were to resist the arm, and, *vice versa*, unless the arm were to resist the cue. Now, it may be remembered that resistance is not itself a motion so much as a negation of motion,—a negation of right that bodies have to be moved in certain directions. If this be so, the question arises, whether in the case proposed, where only vital motions are supposed to exist within an organism, either the organism itself or surrounding bodies have any right that other portions of matter should not move into their places. If they have not this right they cannot resist motion, and unless motion be resisted it cannot pass from subject to subject.

Hence, vital and mechanical motions would seem to differ in this, that the latter pass from subject to subject, on certain conditions; whereas the vital movements suffer no resistance, and therefore cannot be communicated by one agent to another. If this be so, it explains at once how it comes to pass that in those cases in which both species of motion are present, as when I beat the air with my hand, the mechanical motion passes into the atmosphere, whilst the vital action remains altogether within the arm. The former passes because it is resisted; the latter does not suffer resistance, and therefore cannot pass.

Should any reader consider this explanation unsatisfactory, I do not see what remains for him but to say, with Suarez, that both the mechanical and vital motions are transient in the case of organisms. But see what this implies. It is, to begin with, a downright contradiction of the common teaching of the Schoolmen. It implies, moreover, that more motion is constantly passing from living organisms, than is being received by the same from inanimate matter; in other words, that all living things, from the smallest microbes to the largest trees or mammals, are ever generating new motions, and

transmitting them to the air, the ether, and to other substances, in which they are being accumulated in vast quantities as the centuries roll by.

It may be so. The earth, nevertheless, remains very much the same; but of course, it may be giving out more energy than it receives from the ether in which it revolves. The balance used certainly to be against our planet, while it was cooling down, in the early days of its existence. It may be so still. It may even be that in the vast organic deposits which have been formed on earth since life began, there are stored up not only the motions received from sun and stars, but much of the vital energy spontaneously developed within living organisms. It may be so: for my part, however, I prefer to adhere to the common teaching of the Schoolmen, and seek for a solution of the difficulties here suggested, in some direction such as that which I have endeavoured to point out.

CHAPTER XVI.

FREE-WILL.

I.

IF there be any form of vital action which more than another would seem to be capable of explanation only in accordance with the principles of the dynamic theory, it is the free exercise of the human will. To prove the existence of such a faculty does not come within the scope of this Essay ; it is easy enough to bring home the truth to any one who reflects on his own actions, allowing his common-sense fairly to distinguish between them.

Within every man there are three great classes of motions. The first class comprises those movements which are purely mechanical, such as gravity,—the action by which we weigh so many pounds. Next, there are vital actions, like vision, which on certain conditions must take place as surely as gravity itself must act. Healthy eyes cannot abstain from seeing, as long as they remain open in clear daylight. But may not one choose to close one's eyes? Such choices are said to be free ; they are different *toto coelo* from necessary acts, like vision ; and consequently they constitute a third class of movements, which differ in nature from vision as much as this differs from the mechanical motion which we call weight.

Our intellectual nature refuses to believe that these three classes of movements are essentially the same. A body weighs equally whether it be alive or dead, whereas vision can proceed only from a living eye. And it is no less sure, clear, absolute, that a man must see while his

eyes are open ; whereas he is free, when he thinks of it, at least in desiring to keep them open or to close them to the light.

I do not say that all this is not surrounded with mystery, as are all other perceptions, no matter how primary, when subjected to a thorough analysis. Consciousness, memory, testimony of the senses, faith, are each open to objections. Any one could apparently demonstrate that their testimony is worthless ; yet even in the process of demonstration nature proves too strong for the controversialist, and he yields to the very influences which he so triumphantly shows to be of no account. So it is with Free-will : able men have been known to argue against it, to have apparently convinced themselves of the utter absurdity of the notion whilst in their daily life, nay in these very argumentations, they are seen to rely confidently on the very principle which they pretend to refute.

I will ask you to consider briefly the nature and conditions of Free-will. As we proceed in this investigation, opportunities may be found of explaining some of the difficulties in which recent materialistic writers have got themselves so much entangled ; I hope to show that their arguments are based on a misconception of the nature of freedom. The direct object of this Chapter is to consider Free-will in its relation to "force."

A Dynamist might argue somewhat in this manner :—Free actions are those which the agent can perform or omit at his own option. He is supposed to be at rest, and to get an opportunity of moving. If he continues inactive, no "force" is necessary. But if he chooses to move, and actually produces a motion, the question arises : from what does the motion proceed ? Not from any external agent imparting the movement to the faculty which is put in motion ; for, in that hypothesis,

the person moved would have no option in moving ; he should be moved whether he willed it or no. Therefore, the motion must come from within himself,—from some principle such as “force” is represented to be.

I am well aware that all Dynamists will not accept the foregoing as a fair statement of the theory, as they understand it. Thomists, in particular, have some reason to complain of this way of presenting their view of the matter ; and even the followers of Molina would modify the statement in at least one important particular. As we go on, each party will get an opportunity of putting in its disclaimer, and of having its special position accurately defined. The statement, as it stands, seems to me to represent fairly what is in the mind of the average Dynamist,—at least when he is not engaged in endeavouring to square his ideas on this matter with the Catholic doctrine of the divine co-operation. It is the best general explanation I can give, and supplies all parties with a basis of discussion at least.

II.

To me it seems most important to determine, first of all, whether Free-will consists in a power of passing at one's option from a state of inactivity to activity,—a power of *initiating action* or of remaining inactive, according to the agent's choice. It is quite plain that the will remains free after its action has begun. At any time during the progress of a free action one may cease to act ; that is, one may pass from action to non-action. May one, similarly, pass from non-action to action, in such manner as that the new action may be free in the very first instant of its duration ?

1. As Free-will is conceived by many, it would seem to involve the notion of power to *initiate* movement at

pleasure. Thus, Liberatore defines it as “the faculty of *determining oneself to act*; or, in other words, the faculty whereby, all requisites for an action being present, the agent can elicit the action or abstain from it [cohibere], can *break out into one kind of activity or into the opposite*.”¹ This may be said to be the received definition of Free-will in the Jesuit schools.²

It should be always borne in mind that those who favour the foregoing definition, understand by “the faculty of determining oneself,” a power so active *in actu primo*, as to be able of itself to produce the *actus secundus* without needing to be premoved thereto by an external agent. In other words, the faculty is supposed to have within itself a “force” of some kind, whereby, all other requisites being present, it can initiate motion. Suarez writes :—

“Indifference to various acts and their absence is not sufficient for liberty ; in addition an internal force is requisite, whereby the faculty may determine that indifference to either side. This force, however, cannot be found in a passive faculty, as such, but only in one which is active. The reason is, because, if a faculty be indifferent, without an internal power of determining itself, as far as it is itself concerned, it will always and necessarily remain in the same disposition and indifference, or want of action, until it be determined by another.”³

¹ “Libertas indifferentiæ definiri potest : facultas se determinandi ad actionem ; seu aliis verbis, facultas qua, positis omnibus ad agendum requisitis, possit agens actionem elicere vel cohibere, in hanc vel oppositam prosilire.” Psych. Cap. 1, a.8.

² See e.g. Suarez, *Opusc.* I. L. 1, c. 3, n. 1 ; Mazzella, *De Gratia*, D. 1, a 3, n. 91.

³ “Ad libertatem non sufficit indifferentia ad varios actus et carentiam eorum, sed necessaria est interna vis qua talis facultas possit eam indifferentiam ad alterutram partem determinare ; haec autem vis non potest esse in facultate passiva ut sic, sed in activa. Ratio est, quia si facultas sit indifferens sine interna vi se determinandi, quantum est ex se semper ac neces-

Liberatore is quite in accord with Suarez. He proposes as an objection to the doctrine of Free-will, that "the will is a power; but a power, in order to act, must be determined from without; and whatever is determined from without is not free." This difficulty he solves by distinguishing between active and passive potentiality; thus :—

"Two kinds of powers have to be considered; that which is called passive, and which presents but a capacity of receiving some perfection (such, for instance, as marble in relation to roundness); and an active [power], which consists in a certain force and principle of the action to be elicited. . . The latter is either necessary or free, according as its operation proceeds from the determination of nature, or from the choice of the power itself."¹

Innumerable extracts might be quoted to the same effect. The human will is represented as being active in the sense of having within itself a "force," whereby, without being moved or determined by any other agent, it can proceed to embrace a good presented to it by the intellect, or to choose between two such presentations.

2. Now, the doctrine of Free-will understood in this sense is equivalent to a denial of the premotion of free acts by God; it involves a repudiation even of the

sario manebit in eadem dispositione ac indifferentia, seu carentia omnis actus, donec ab alio determinetur." *Metaph. D. 19, s. 2, n. 19*; comp. *Opusc. I. L. 1, c. 2, nn. 1 &c.*

¹ "Obj. vi. Voluntas potentia quaedam est. Atqui, potentia, ut agat, extrinsecus eget determinari; quidquid autem extrinsecus determinatur non est liberum; . . . Resp. *Dist. Major.* Voluntas potentia est activa et libera, *conc.*; mere passiva, *negamus*. Duplex potentiae genus considerandum est; ea quam passivam nominant, quaeque non affert nisi perfectionis cujusdam suscipiendae capacitatem (cujusmodi est ex. gr. marmor quoad rotunditatem); et activa, quae vis quaedam est et principium actionis eliciendae. . . Posterior dividitur in necessariam et liberam, prout ejus operatio a determinatione naturae vel ab ipsius potentiae electione procedit." *Psych. c. 1, a. 8, obj. 6.*

necessity of divine *co-operation* with the Free-will of creatures. Ask yourself how does Liberatore's own proof of the necessity of the divine co-operation harmonize with this notion of Free-will determining itself to action by means of its innate "force?" The following, it will be remembered, are the words of the argument to which I refer :—

"Created things [without exception, including every creature, even the Free-will of man], when they act, are increased in some manner by that very exercise of activity, and are physically perfected in some measure. For, surely, to actually act is something more than to have merely the power of acting. But without the aid of a wealthier cause nothing can give itself that whereby it becomes richer in reality, and is reduced from potentiality to act. Therefore, created efficiency of every kind, in order to act, requires the aid of some higher cause. But this, as is plain, can be God alone."¹

One is inclined to suspect that when writing these words Fr. Liberatore had forgotten what he had said in connection with Free-will. That faculty, at least, is not merely passive,—capable only of receiving the divine largess. It is active ; it has "force," whereby it is able to determine itself to act, if it likes ; to act in this way or in that, according to its own good pleasure. Otherwise the objection of the Materialists holds good :—without such a power of determination the will must be determined from without ; and then what becomes of its freedom ?

One would be inclined to suspect that the learned writer had forgotten this ; but he remembers it, repeats it, and—what would you think?—undertakes to refute it ! Let the reader compare two passages given here side by side : the first is Fr. Liberatore's reply to the

objection against Free-will ; the second is his solution of a difficulty in connection with the divine cooperation :—

“ *Obj.* The will is a power ; but a power, in order to act, must be determined from without, and whatever is determined from without is not free.

“ *Answer.* Two kinds of power have to be taken into account : that which is called *passive*, which presents but a capacity for receiving some perfection ; . . and the *active*, which consists in a certain force and principle of the action to be elicited. . . The latter kind is either necessary or free, according as its operation proceeds from the determination of nature or from the choice of the power itself.”¹

“ *Neither let anyone say that created things are endowed with sufficient activity by means of which they may elicit actions of their own force (marte suo).*

“ For, that they are active is a proof that they really act in their actions, but by no means excludes the influence of God's aid. Nay, it rather proves [the necessity of the divine co-operation]. For, the power of acting (*vis activa*) possesses the action but virtually ; and this virtual possession is, surely, less than the actual possession which causes have when they actually elicit an operation. For, if it were not so, they [the causes] would never spring into action, nor would they be perfected by the action which they perform.

“ *Wherefore, all created activity is a mixture of potentiality and act ; inasmuch as it consists of force (vi constat), but in such manner that its efficacy is further completed by the action to be performed.*”²

Surely, these two passages contradict each other. The difficulty in the first is made the exposition in the second ; and the objection urged by the adversary in the

¹ See Latin text, p. 369.

Latin text at p. 96.

second, is the solution of the difficulty of the first. Have we within our Free-will a "force" whereby we may determine ourselves to act, without need of any assistance from an external agent? If we have not, how is the argument against Free-will to be answered? "A power, in order to act, must be determined from without." Not, replies Liberatore, if it be active, if it "consist in a certain force and principle of the action to be elicited":—that is, if it have a "force" whereby it is enable to elicit its own act. Good. But, Free-will is thus admitted to be "endowed with sufficient activity by means of which it may elicit actions of its own force"; where, then, is the need of the divine co-operation? The reply, according to the same Liberatore, is, that the "force" existing in the will "possesses the action but virtually; and virtual possession is, surely, less than the actual possession which causes have when they actually elicit an operation." The meaning of which is: though the will has "force," it must get something else before it can determine itself to action. What else can it get, unless, as the first objection contends, it be a determination,—an action? And how can it get this unless by receiving it from without?

If the will be active enough to be able to determine itself without being determined by an external agent, as it must be, according to Liberatore, in order to be free; why can it not act without any immediate divine co-operation? And if this divine co-operation must first be given, in what sense is the will free? How has it a "force" whereby it may determine itself?

I decline to allow myself to be involved in a contradiction of this kind. If the "force" possessed by the will does not enable it to operate actually, until it is further perfected; and if no being can give itself that whereby it becomes richer in reality; I can see nothing for it but

to draw Liberatore's own conclusion : created efficiency of every kind, even the Free-will of man with all its forces, in order to act, requires the aid of some higher cause. And I do not see that we are free not to accept this additional perfection. In other words, I cannot admit that we, who are undoubtedly free to abstain from certain acts to which our wills have been already moved from without by God, are also free to accept or reject the divine premotion in the first instance of its existence.

This doctrine is not by any means novel ; it is to be found where one would least expect to find it,—in Cardinal Mazzella's work on Grace.¹

“ When (the will) freely consents through grace, as adjuvant, it is supposed to be already excited by grace, as prevenient ; but a will which is already excited by grace, already elicits a indeliberate act. *When, therefore, it freely co-operates with grace, it should not be said to reduce itself from potentiality to act ; it ought rather to be regarded as not desisting from an action already begun, persevering in or perfecting the same.*”

He had previously ² laid down the following thesis :—

“ *The acts of intellect and will, in which purely exciting grace, passively regarded, consists, are indeliberate ; hence, in producing them our faculties co-operate vitally but not freely.*”

¹ “ Quando (voluntas) libere consentit per gratiam ut adjuvantem, jam supponitur excitata per gratiam ut praevenientem ; voluntas autem excitata per gratiam jam elicit actum indeliberatum ; libere ergo gratiae cooperando non debet proprie se reducere de potentia ad actum, sed debet potius a coepta actione non desistere. in illa perseverare, illam perficere.” D. 3, a. 7, n. 683. Compare D. 3, a. 8, nn. 734-5.

² “ Dicimus ergo ; *actus intellectus et voluntatis, in quibus gratia pure excitans, passive inspecta, consistit, sunt actus indeliberati ; ad quos proinde efficiendos facultates nostrae vitaliter quidem non vero libere, concurrunt.*” D. 1, a. 4, n. 116. The italics are in the original.

I would have you observe the distinction between grace regarded as passive and as active,—a distinction which runs all through Molinistic Theology. The grace must be regarded in the first instant as a *passio*, before it becomes an action. May I ask how it can be regarded as a *passio*, unless the faculty be passive in receiving it? Is the faculty, then, passive in the first instant under the divine motion? If so, in what sense does it in the same instant “co-operate vitally in producing” the motion? For it is supposed, you will remember, to co-operate vitally even in those indeliberate beginnings of actions which are not yet free. And if it co-operates vitally in the very first instant of its action, in what sense is it then purely passive, or how may it be so regarded by any reasonable man,—in the hypothesis that vital co-operation consists essentially in the exercise of a vital “force.”¹

The true idea of Free-will, therefore, seems to be that it is a vital faculty, which like every other mere faculty, must be moved to action from without; but which, being vital, can be so moved by God alone. Moreover, it is free; not indeed to receive or to reject the divine motion in the first instant; but only *to abstain from retaining* the motion after it has been received. This is the only concept of Free-will that can be reconciled with the doctrine of divine premotion;

¹ “Passive [sumuntur gratiae actuales] si considerenter in ordine ad subjectum in quo recipiuntur. . . . At vero, quid sunt *illustratio et inspiratio si passive* considerentur? Respondetur eas consistere in *duplici actione vitali intellectus et voluntatis*.” Idem, D. I, a. 4, nn. 110, 114.

The reader will not fail to remark how Cardinal Mazzella teaches in these passages that *actions*, even *vital actions*, may be regarded *passively*, as being really infused into and received by the subject faculty. Accordingly, the faculty, though active, is passive also; nay more, for all its activity, it cannot actually act until it has been first acted on. Where, then, is the need of “force”? And in what does this notion of activity differ from mine?

accordingly, it has been always advocated by the Thomists, and even now is admitted by the Jesuists themselves. How, may I ask, does it harmonize with the idea of "force,"—an innate principle whereby the faculty itself can at least contribute to initiate its motion?

III.

The next point to be considered is, in what sense it may be said with truth that the will is *free to abstain from* motions which it is not free in receiving. After the action has been excited by God, and while He, on His part, is prepared to continue the motion, may the faculty cease to be moved, at its own pleasure? May this power of ceasing be actually reduced from potentiality to act? And is it even sometimes so reduced?

The question is not, as some would have it, whether a motion once given may not have been given at all. God is free to give or not to give; but if He gives, He cannot at the same time withhold His gift. This is altogether manifest, and is not in any way peculiar to free actions. He was at liberty to create the world, which neither was free in being created, nor is free in being conserved. Once created, however, it could not but have been brought into existence. The present question is not to be understood in that sense, about which there is no difficulty or difference of opinion; but rather, whether Free-will differs from the material world in this, that, whereas matter once moved must continue in motion until it is stopped from without; the Free-will of man, even after it has been moved, may, at its own pleasure, and without being stopped by any external agent, actually abstain from the motion it has received.

Now, it seems incredible that some of the ablest of our Catholic theologians and philosophers should maintain

that the will of man is not free in this sense. I know how difficult it is to select terms which they will not regard as misrepresenting their opinion. They do not deny, as far as words go, that the will is free even after it has received the divine premotion ; but if you ask them whether, after it has received the motion, it can at pleasure actually abstain from moving, their answer is, that it *cannot* or that it *infallibly will not abstain*.¹

Let me draw your attention to the significance of the word "infallibly" in this reply. Some of these authors rely very much on the distinction between infallibility and necessity ; as if the latter quality, but not the former, were the opposite of liberty. I have never been able to see any ground for this assurance. He alone is *infallible* who *cannot* err ; that is, whose security from error is the *necessary* consequence of some principle of infallibility. If, therefore, an action is infallibly connected with the divine premotion, it must necessarily flow from the same.

Let it be borne in mind, moreover, that infallibility in connection with these free actions is represented by the Thomists themselves as being altogether absolute ; it is the infallibility of the divine fore-knowledge, which not only will not err for a certainty, but must necessarily be true. This necessity is the greatest and most absolute of all. It is admitted that when God gives His premotion, and as long as He continues to give it, the

¹ Premotion is defined by Gonet (*Clyp. Thomist.* D. 9, a. 5, sec. 1) as an " *actio Dei quae voluntatem humanam, priusquam ipsa se determinet, ita ad actum movet insuperabili virtute, ut voluntas nequeat omissionem sui actus cum illa premotione conjungere.*" Yet such an action is represented as being free. Billuart modifies necessity into infallibility. " *Inter gratiam et effectum est connexio infallibilis, non solum infallibilitate praescientiae, ut volunt Congruistae, sed causalitatis*" (*De Gratia*, Diss. 5, a.6). This, as far as I know, is the way in which the modern writers of the same school represent the matter

creature will act and will continue to act, as certainly as God's fore-knowledge cannot err ; for it is by means of the premotion alone that He is able to foresee the act. Now, surely, God's fore-knowledge must *necessarily* be right ; and consequently, the act which is thus connected with it must follow not only with infallibility but of necessity.

This, however, is somewhat of a side issue, with regard to which it may be said that I do not fairly represent the teaching of the Thomists. It may be better, therefore, to confine ourselves to the main question, which is : may the will, at pleasure, actually abstain from a motion which it has received from God, and which He will continue if allowed to do so by the created faculty ? It is for the Thomists themselves to say what their answer is. If it be in the affirmative, I have no ground of controversy with them on the point ; that is the precise sense in which I myself understand the will to be free. But if the answer be negative, it is for them to explain how a faculty can be really free in its motion, which neither can effectually refuse to receive the motion at its inception, nor effectually abstain from it at pleasure when it has been once received. If such a condition of things be compatible with freedom, why are we not free in our revolution with the earth around the sun ?

IV.

There is one other point of importance. We have seen that the will is not free to begin to act, until it has been moved from without by God ; but once moved it may in many cases abstain from continuing the motion. It is only in these cases that we are really free. One would like to know whether we may not only abstain from a present motion, but, in doing so, begin to move

in a different direction and towards a different object. Suppose, for instance, that one is at present walking in the direction of Dublin ; may such an agent, at his own pleasure, and without being moved from without, not only stand still, but retrace his steps and walk in the opposite direction ?

Many of our Catholic writers are of opinion that we are free in this sense. In their view Free-will is a faculty which is not only able to act or *not to act*, but is capable of choosing between two different modes of action. There are two coins before me, a shilling and a sovereign, or two sovereigns : the contention is that I have the power of determining myself to take either one or the other,—that I have this power independently of any external motion in the particular direction which I shall actually take. It seems to be granted by these writers that one cannot move at all until one has been moved from without by God ; this divine premotion, however, is represented as general, indeterminate,—somewhat as the action of steam is in the boiler of a locomotive, which may be turned by a human will into this direction or into that.

It has always seemed to me a fatal objection to this view, that the will cannot determine itself unless by an action ; and, as it has been so often said, there can be no action or motion of any kind unless what is infused from without by God. When a locomotive is on one line of rails, it can be switched on to another line : has not the switching to be done by an action, which, like every other action, must come from God ? It is a very little action in comparison with the motion of the locomotive ; but the principle is the same in both ; and it is the principle of activity and not its quantity which is in question here. If the very smallest motion could be proved to proceed from a created faculty unaided by the divine

premotion, it were all over with the Catholic doctrine of the necessity of divine co-operation in the actions of created things.

I do not believe that we are free in the sense of being able to determine ourselves to one object or another, without being previously moved by an external agent. Not, of course, that, when walking, we cannot turn back or aside at pleasure ; or that we are incapable of the action of selecting one of two coins placed within our reach. In a most true sense we are so incapable. No one can freely turn aside or backwards, unless he has previously thought of the new object towards which he is to move : nor can we select a coin unless we have first perceived it.

What happens, then, in all cases is this. We get a motion towards an object ; and we are free either to continue to move in the same direction, or to come to a full stop. Should we stop, another object may be revealed to us by the faculties of perception ; and immediately and independently of our own choice we are pre-moved towards it from without, in a direction altogether different from that in which we had moved at first. Under the influence of this new motion we are free to continue moving or to stand still, just as before ; but we are not free to move once more towards the former object, until it has been once more perceived, and until this perception has been followed by a motion towards the object, infused into the will from without.

When once put in motion you can continue to move or you may stop, as you please ; but I defy you to move in any direction until you have been moved in that direction, no matter how unfettered you may imagine yourself to be. You may say that one who has been sitting still, may, of his own option, begin to walk about. Could he stir, unless he had first *thought* of

stirring? And when in thought he first proposes to himself walking as something desirable for him in the circumstances, can he abstain from having in his will a kind of indeliberate desire—*motus primo-primus* the Schoolmen call it—to command the body to get up and walk? The body may not stir in the least; and if there should be some slight internal movement, the will may often quiet it immediately, by ceasing to be moved for its own part. But the will itself is moved necessarily in the first instant towards every good presented to it as such by the intellect; and neither will nor any other created faculty can move until it has been moved. Cardinal Mazzella's words, quoted already, are quite distinct on this point:—"The acts of the intellect and will, in which purely exciting grace, passively regarded, consists, are indeliberate; hence, in producing them, our faculties co-operate vitally but not freely."¹

Accordingly, Free-will essentially consists, not in a power of passing at pleasure from inactivity to action, without being moved by any other agent; nor in any faculty of determining a general motion to a particular direction; but in the capacity of abstaining from a motion once received. If the earth could stop, at pleasure, in its revolution round the sun; if healthy human eyes opened to daylight could abstain from seeing surrounding objects; if brutes could restrain themselves from following their passions and instincts, or were capable of being restrained in any other way than by being borne on a stronger current in a different direction;—they should all be as free in their movements as is the will of man.

It may be objected that, at least, one must *make up one's mind* to abstain; and that this is an action, which

¹ See page 373

seems to be independent of external premotion. True, one must make up one's mind; but how? By an action? Or by abstaining? I say, by abstaining, when one sees that the object towards which one is tending is limited in goodness, and that so it is possible to abstain. The agent cannot propose to himself abstinence from motion as a positive good, and tend to this by a positive act, unless after he has received a positive premotion. But, given a motion in the will towards an object which is seen to be limited, the will can at any time abstain from moving, without thereby producing within itself a positive action or motion of any kind. According to the old definition of liberty, which is almost traditional in the Catholic schools,¹ it is not a faculty of making up one's mind and acting accordingly; nor is it a power of determining oneself, or of choosing between actions of various kinds: but it is the faculty of acting or of *not acting at all*. Now, the only way in which one can *not act at all*, is *to abstain from all action*,

¹This is the definition of liberty commonly received by the later Schoolmen; it is not found in St. Thomas. Suarez writes:—"Communitur dicitur potentiam liberam esse, quae, positis omnibus requisitis ad agendum, potest agere et non agere. Haec enim descriptio, quae frequens est apud theologos, et facultati liberae et usui ejus libero accommodari potest." *Opusc. 1, De Concursu, &c.*, cap. 3, n. 2. The words of Billuart are:—"Nunc valde communis circumfertur libertatis definitio, nempe: facultas quae, positis omnibus ad agendum requisitis, potest agere vel non agere. Hanc definitionem non rejicimus, sed absque explicatione non admittimus." The explanation which he requires, refers to an ambiguity which has no reference to the point we are now discussing. (*De Act. Hum.* Diss. 2, a. i., sec. 4.) In the first part of the *Summa* (qu. 83, a. 3) St. Thomas gives a formal definition of liberty, which is remarkable for one word. "Ex hoc liberi arbitrii esse dicimur, quod possumus unum *recipere* alio recusato, quod est eligere." I have italicized the word "*recipere*," begging the reader to remark that the holy Doctor does not say that liberty is the power of *doing* this or *doing* that; it is a power of *receiving* one thing, having refused another. Does one require a "force" within one in order to be able to *receive*?

even from the action of making up one's mind not to act.

v.

From the foregoing one may easily gather the solution of the argument which was urged by Mill with so much speciousness in favour of his necessitarian doctrines. According to Mill's view, we always act and must act as we are for the time being impelled by the stronger motive :—

“Take any alternative, say to murder or not to murder. I am told that if I elect to murder I am conscious that I could have elected to abstain ; but am I conscious that I could have abstained, if my aversion to the crime, and my dread of its consequences, had been weaker than the temptation ? If I elect to abstain, in what sense am I conscious that I could have elected to commit the crime ? Only if I had desired to commit it with a desire stronger than my horror of murder, but not with one less strong. When we think of ourselves hypothetically as having acted otherwise than we did, we always suppose a difference in the antecedents ; we picture ourselves as having known something that we did not know, or not known something that we did know ; which is a difference in the external inducements ; or as having desired something more or less than we did ; which is a difference in the internal inducements. . .

“I therefore dispute altogether, that we are conscious of being able to act in opposition to the strongest present desire or aversion. The difference between a bad man and a good man is not that the latter acts in opposition to his strongest desires ; it is that his desire to do right, and his aversion to doing wrong, are strong enough to overcome, and in the case of perfect virtue, to silence, any other desire or aversion which may conflict with them. It is because this state of mind is possible to human nature, that human beings are capable of moral government ; and moral education

consists in subjecting them to the discipline which has most tendency to bring them into this state." ¹

There are many portions of this extract on which one would like to make observations ; but I must confine myself to what seems to be the main source of fallacy in the argument. The alternative proposed is "to murder or not to murder." Now, to abstain from murder may be the object of a positive act of the will, or it may not be, according as it is represented positively or as a mere negation. How could a positive action be terminated in a mere nothing ? One abstains from action without an action of any kind.

If the will must be in action, or if an action once infused into it must stay there until overcome by a contrary motion, as happens to the appetites of the brutes, then it would be impossible for the will to be free. But if it may abstain altogether ? If, when the temptation to murder arises, and the will is moved necessarily, in the first instant, to desire to do the deed, it may, on perceiving the limitation of the good to be derived from murder, abstain from the motion already existing within it ;—where is the stronger present desire or aversion ? Where is the need of a second desire at all ? If there be only one limited good before my appetite, must I embrace it and continue to embrace it as long as it is present to my mind ? Where is the proof that I must ? Universal experience of the difference between various kinds of vital actions, some of which we cannot abstain from, as in the case of vision or of digestion, whilst we do abstain from others, is proof sufficient that there is no such necessity.

Or, take the actions of the will itself, to which good may be proposed either absolutely and without limitation,

¹ *Examination of the Philosophy of Sir W. Hamilton*, pp. 583-5.

or as limited to some particular form or kind. When good in general is proposed to our appetite, we feel ourselves attracted irresistibly towards the object. This perhaps, is the reason why a necessary motion of the will is the consequence of the exhibition to it on the part of the intellect of even a limited goodness ; for good must be proposed absolutely before we can advert to its limitation. When, afterwards, the limitation is recognised, it is the universal experience that the conditions are wholly changed ; we can now abstain from the motion which followed necessarily before. There may be difference of opinion as to which of the faculties perceives the difference in the relation of the appetite to its action in each of these cases ; but the common sense of mankind testifies that the difference is perceived in some way, and that it really exists.

It is denied, then, that when we think of ourselves hypothetically as having acted otherwise than we did, we picture ourselves as having known something that we did not know, or not known something which we did know. With the very same knowledge we may continue to act or we may abstain. We cannot, indeed, *positively move away* from the object by an act of hatred, unless our knowledge be changed ; that is, unless the object be proposed not only as not absolutely good, but as evil. An act of hatred, however, is altogether different from abstention, about which Mill speaks, and which is plainly sufficient for freedom.

VI.

Returning to the primary subject of this Essay, I will ask the reader to consider, under the light of what has been said in this Chapter, which of the two theories of activity, the dynamic or the kinetic, is more in accordance

with free-will properly understood. Let me repeat once more, in the words of Fr. Liberatore, that any power of acting with which creatures,—even free agents,—may be endowed, possesses action, indeed, but only virtually; and this virtual possession is, surely, less than actual. Where, then, is the actual action to come from? Not from the creature with all its forces; for, “nothing can make itself richer in reality.” It remains, then, that free actions be infused by divine premotion; which means that “force,” as distinct from the action itself, is nothing but the capacity to receive and to sustain a motion.

CHAPTER XVII.

THE PRIME MOVER.

I HAVE endeavoured to show that the dynamic theory dispenses with the necessity of divine co-operation in the actions of creatures, and thus directly results in Naturalism,—the modern form of the Palagian heresy. I propose now to submit proof of a still graver charge ;—that if the theory in question does not altogether destroy, it considerably diminishes, the force of one of the most important of all the arguments for the existence of God.

I.

The argument to which I refer has got special prominence of late, owing to the controversies with regard to Evolution, and because it tells in a special way on those who are accustomed to the study of the physical sciences. It would not, I think, be far from the truth to say that it is the proof on which scientific men who are also Theists, rely most confidently, if not altogether, in these latter years. And in this they are quite in harmony with the teaching of Holy Writ, which refers us to the “good things which are seen,” and “the greatness of the beauty and of the creature,” for proof of the existence of a Creator; and which finds this proof not only in creation strictly so called,—of substances such as matter and human souls,—but in “the rains and fruitful seasons” and in “the food and gladness” with which our hearts are filled.¹

It seems to me that the two following propositions are the premisses of this argument:—(1) The material universe is incapable of producing either a new sub-

¹ See *Wisdom*, c. 13; *Acts* c. 14, v. 16.

stance or a new force ; and (2) physical science testifies to the fact that substances and forces have been produced in the past, and are being produced continually.

1. The first of these propositions is but a succinct statement of principles which all scientific men now regard as the basis of physical science,—the Improductibility and Indestructibility of Matter and Energy. It does not fall within the scope of this Essay to give an elaborate proof of either of these premisses ; yet I may be allowed to sketch the lines on which such an argument would run.

Mr. Herbert Spencer writes ¹ :—

“ There was once universally current a notion that things could vanish into absolute nothing, or arise out of absolute nothing . . . Nor have dark ages and inferior minds alone betrayed this belief. The current theology, in its teaching respecting the beginning and end of the world, is clearly pervaded by it ; and it may be questioned whether Shakespeare, in his poetical anticipation of a time when all things shall disappear and ‘leave not a rack behind,’ was not under its influence. The gradual accumulation of experiences, however, and still more the organization of experiences, has tended slowly to reverse this conviction ; until now *the doctrine that Matter is indestructible has become a commonplace.* The comet that is suddenly discovered in the heavens and nightly waxes larger, is proved not to be a newly-created body, but a body that was until lately beyond the range of vision. The cloud which in the course of a few minutes forms in the sky, consists not of substance that has just begun to be, but of substance that previously existed in some more diffused and transparent form . . . Conversely, the seeming annihilations of Matter turn out, on closer observation, to be only changes of state. It is found that the evaporated water, though it has become invisible, may be brought by condensation to its original shape. The discharged fowling-piece gives evidence that though the gunpowder has

• ¹ *First Principles* (Fifth Edition), sec. 52.

disappeared, there have appeared in place of it certain gases, which, in assuming a larger volume, have caused the explosion. Not, however, until the rise of quantitative chemistry, could the conclusion suggested by such experiences be harmonized with all the facts. When, having ascertained not only the combinations formed by various substances, but also the proportions in which they combine, chemists were enabled to account for the matter that had made its appearance or become invisible, scepticism was dissipated. And of the general conclusions thus reached, the exact analysis daily made, in which the same portion of matter is pursued through numerous disguises and finally separated, furnish never-ceasing confirmations. Such has become the effect of this specific evidence, joined to the general evidence which the continued existence of familiar objects unceasingly gives us, that *the Indestructibility of Matter is now held by many to be a truth of which the negation is inconceivable.*"

So much for matter; now for energy. Mr. Clerk Maxwell states as follows the well-known Principle of Conservation :—

"The total energy of any material system is a quantity which can neither be increased nor diminished by any action between the parts of the system, though it may be transformed into any of the forms of which energy is susceptible."

So that, if the whole universe be regarded as one system, its total energy cannot be increased by any action between its parts, but can only be transformed in many ways, without changing its quantity.

Modern scientists do not, as a rule, contemplate the production of substantial forms; yet it is plain that the Principle of Improductibility applies equally to them as to matter and energy. For, to use Clerk Maxwell's terms,² the Principle in question is not merely "a deduction from observation and experiment," capable of

¹ *Matter and Motion*, art. 74.

² *Ibid.* a. 73.

“asserting no more than that no instance of a non-conservative system has hitherto been discovered.” It is “a scientific or science-producing doctrine,” which, “when once apprehended, furnishes to the physical inquirer a principle on which he may hang every known law relating to physical actions, and by which he may be put in the way to discover the relations of such actions in the new branches of science.”

Now, what is the difference between a “deduction from observation and experiment” and “a science-producing doctrine” or “principle,” except this, that the science-producing principle is truly universal,—that is, it applies to future events as well as to past experiments, to “new branches of science” as surely as to those which have been already investigated ;—whereas the mere deduction is but a condensation of experiments that have been actually gone through? The Principle of Improductibility, therefore, being a principle, applies not only to matter but to every substance. Indeed, who can doubt the inability of mere matter, with all its energies, to produce a spirit such as the human soul? Or to communicate any species of substantial form of a higher order than it already holds in its womb? It cannot generate energy, but only transform what it already possesses. Surely, energy is much lower in the scale of being than is the lowest species of substance. Hence, I do not see how there can be any reasonable objection to the form in which the principle is stated in the first premiss of the argument to which I am calling attention : the material universe is incapable of producing either a new substance or a new “force.”

2. The second premiss deals with facts, for evidence of which we appeal to the history of the universe. The proof of this premiss, accordingly, is as wide as science itself, whether physical or metaphysical : there is nothing

which does not proclaim the glory of its Creator, when properly understood.

Astronomy assures us that the solar system was at one time a vast nebula, probably part of some vaster system which had slowly become evolved from chaos. Of this chaotic state we have but little knowledge. Matter was then matter ; it had motions, or at least was capable of having them ; but how many *kinds* of matter and motion there were in it, who can tell? We may suspect that there was originally but one, or at most very few kinds of both ; and that these first and simplest forms of matter were as different, say, from hydrogen, or even from ether, as these are from the human brain ; whilst, in comparison with the original motions of these primeval substances, gravitation and chemical action are complexity itself.

Moreover, whether the first forms of matter and motion are at present in existence in any portion of the universe, we are equally unable to say. They may be, in some little-developed nebula of the Milky Way ; but the analogy of worn-out species with which Geology has familiarized us, would lead us to expect that in Chemistry as in Biology the primeval forms have become extinct.

It will be seen, accordingly, that in the history of the universe, as in that of man, there is a region of mist, in which we can but guess and speculate as to what may have been. As, however, that portion of matter on which we dwell grew more and more settled in its separate existence, like societies of men it began to keep its records more and more faithfully age after age. And though in its early years the earth was involved in much of the mist of the nebula from which it was developed, yet in its history there were three great events, ascertained with absolute certainty, as far as we can have certainty in such matters, and which must

ever rivet the attention of the physicist and the metaphysician alike. They are: the origin of life, of sensation, and of intelligence, on this planet.

If the testimony of science can make us assured of anything, it is that there was a time when no intelligent animal existed on the earth; that there was a period, even, when matter in this region of the universe had not reached the stage of self-conscious feeling; that in ages more distant still the earth was heated so as to exclude the possibility of its supporting the lowest form of life,—in so far, at least, as living forms are known to us.

Here, then, we take our stand, on this absolute testimony, which no scientific man will dare to call in question. Life began; sensation began; intelligence came into being; and we put two questions. (1) Are these three not new forces, supposing new substances as bases of support? And (2), as the material universe is incapable of producing either a substance or a force, is it not manifest that something greater than matter—a Producer—was needed to account for their being produced?

II.

No Materialist could, in any consistency, have the least hesitation about the second of these questions. The Principle of Improductibility is, as has been said, regarded by them as the very basis of science. Thus Mr. Spencer writes:—¹

“It is impossible to think of something becoming nothing for the same reason that it is impossible to think of nothing becoming something,—the reason, namely, that nothing cannot become an object of consciousness. The annihilation of Matter is unthinkable for the same reason that the creation of Matter is unthinkable.”

¹ *First Principles*, section 53.

As the reasoning is based on the impossibility of thinking of "nothing becoming something ;" inasmuch as "nothing cannot become an object of consciousness;" it is plain that the principle must extend not only to matter but to every substance, nay, to every force and other reality whatever. And Mr. Spencer does so extend it in the two chapters following that from which the foregoing extract has been made :—

"Like the Indestructibility of Matter, the Continuity of Motion, or, more strictly, of that something which has Motion for one of its sensible forms, is a proposition on the truth of which depends the possibility of exact Science. Motions, visible and invisible, of masses and of molecules, form the larger half of the phenomena to be interpreted ; and if such motions could either proceed from nothing or lapse into nothing, there could be no scientific interpretation of them."¹

In the earlier editions of his book Mr. Spencer had expressed himself more positively :—

"To think of Motion as either being created or annihilated—to think of nothing becoming something, or something becoming nothing—is to establish in consciousness a relation between two terms of which one is absent from consciousness, which is impossible. The very nature of intelligence negatives the supposition that motion can be conceived (much less known) to either commence or cease." "That the quantity of force remains always the same, is the fundamental cognition in the absence of which these derivative cognitions [about matter and motion] must disappear."²

Someone must have called Mr. Spencer's attention, or he must have himself adverted, to the case of the planets and the pendulum, of which the former "display at one time little motion, and at another time much motion ;" while "with speed now increasing and now

¹ L. c., section 55.

² First Edition, sec. 70, 72.

decreasing, the pendulum alternates between extremes at which motion ceases." Here, indeed, was a difficulty for one who had been teaching that "the very nature of intelligence negatives the supposition that motion can be conceived (much less known) to either commence or cease."

It shows how firmly the Principle of Improductibility has become fixed in the minds of modern scientists, that even the case of the pendulum was not able to shake Mr. Spencer's conviction. He meets the difficulty, not by admitting that in this and similar cases there is an exception to the general law,—that one reality, motion, ceases for an instant and again comes into existence; but by a bold denial of the reality of this motion which ceases and begins anew.

"The truth forced on our attention by these facts and inferences, is that translation through space is not itself an existence; and that hence the cessation of Motion, considered simply as translation, is not the cessation of an *existence*, but is the cessation of a certain *sign of an existence*—a sign occurring under certain conditions."¹

The Metaphysics of this and some of the other passages I have quoted is wonderful, I admit; seeing especially that it is the product of one of those cultured minds that have discarded the myths and superstitions of an earlier civilization, and devoted themselves to the correlation of the exact sciences only. It is not, however, for his Metaphysics that Mr. Spencer is called in evidence, but merely to testify as to how far scientists are committed to the Principle of Improductibility. Though not himself a man of science by profession, he is perhaps a greater authority than any of the mere scientists with regard to the absoluteness and universality with which this principle is admitted.

¹ L. c., 5th ed., sec. 56

It may not be out of place to remind the reader that the Principle of Improductibility is recognised as fundamental in the Aristotelic no less than in the modern philosophy ; only it is not understood by both schools in the same sense. As St. Thomas learned it from Aristotle, it means simply that "without the aid of a wealthier cause nothing can give itself that by which it becomes richer in reality,—that by which it is reduced from potentiality to act."¹ A possibility—which is a nothing, as far as actual reality is concerned—may not thus become a reality, unless beneath the hands of an external producer ; and this is true whether the possibility be of a substance, or of a faculty, or of a force, or of a motion, or of any other reality whatsoever. But we cannot agree with Mr. Spencer that no mere possibility can ever become a reality, even under the hands of an external agent. A billiard-ball will remain at rest, and a bow unbent, as long as there is no external agent to produce in either motion, which results in new locations for the ball, and new figures for the bow. But to Catholics it seems a plain contradiction of the dictates of common sense, to say that the ball may not get a new location, nor the bow a new figure. We are assured, indeed, by Mr. Spencer that "translation through space is not itself an existence," but only "a certain sign of an existence ;" and of course he would say the same of locations and figures. Is a sign, then, a mere nothing ? Is it the same thing—which is nothing—to be at rest and to be moving, as far as the mere translation through space is concerned ? Is it the same thing—that is, nothing—to be here or in Dublin ; to live in this century or in the next ? Mr. Spencer says it is ; at least he says so with regard to translation through space, and there is

¹ See p. 96, for the original, taken by Zigliari from Liberatore, and by him taken from the works of St. Thomas.

absolutely no reason why he should not say the same of all other accidents—or nothings. And this is the result of a life of culture devoted to the correlation of the exact sciences.¹

¹As for the increase and diminution of motion in the planets or the pendulum, there is really no difficulty at all in either case. As the speed of the pendulum slackens, the motion passes from it into the ether or other medium owing to the action of which the pendulum is being pushed back to the earth. The return swing is due to a communication of motion from the same medium, — a communication which goes on increasing till the pendulum has reached the lowest point of its arc, when the resistance again becomes greater than the momentum, with the result of a gradual diminution of speed.

There is one portion of Mr. Spencer's system of Metaphysics illustrated in the foregoing passages, which is too characteristic to be allowed to pass unnoticed. He tells us that "it is impossible to think of something becoming nothing, for the same reason that it is impossible to think of nothing becoming something,—the reason, namely, that nothing cannot become an object of consciousness." Now, one would like to be told by Mr. Spencer, whether, while he was engaged in writing that sentence, he had any meaning before his mind. If so, did the word, "nothing," convey a portion of his meaning? If it did not, why does he make a dogmatic assertion about this "nothing"? And if it did, why does he say that "nothing cannot become an object of consciousness;" which means, I suppose, that we cannot think of "nothing" in any way whatsoever? Mr. Spencer does himself an injustice; he has succeeded in doing what, according to himself, no man can do.

Moreover, when he was writing the clause, "it is impossible," did he mean anything by the word "impossible"? If he did, one would like to know in what the "impossible" he thought of differed from "nothing," except in being such a "nothing" as never can become a "something,"—an out-and-out "nothing." Was that idea "absent from his consciousness" at the time? And, if so, how could he mean anything by what he said?

The reader will not fail to remark the pretension with which this ultra-dogmatist assumes that because the annihilation and the creation of matter are equally unthinkable,—which means that if the Creator were to consult Mr. Spencer about the operation, even that great philosopher could not tell Him, nor even imagine, any way in which it could be done,—therefore the thing is utterly impossible; and *a priori*, too,—independently of experiment and from the nature of the case. Common folk are wont to say a thing is impossible when they see that it is so. But Mr. Spencer is not of the common sort; whatever he does not see to be possible is an *a priori* impossibility. What a wonderfully philosophic mind he must imagine himself to have!

2. Accordingly, the whole controversy turns on the second question : Whether, as each new form arose, a new motion or force was produced ; and whether this demanded a new substance as a basis of support. And this is why throughout the whole course of Philosophy we are so anxious to demonstrate that vital actions are specifically distinct from mechanical motions ; that animals have powers—and therefore movements and substances—different in kind from those of vegetables, particularly the power of self-conscious feeling ; that the free-will of man is, by reason of its being free, an appetite of a different order from those of the brutes, and, being different, proceeds from a different source.

I have already made some brief observations on vitality and free-will, and do not feel called on to add anything regarding the sense-motions of animals. The intelligent reader will not need to be told how to apply the same principles of Philosophy to these actions as to the others. Let him only be careful always to bear well in mind, what even the most advanced Materialists must allow, that we have some means of attaining to a knowledge of difference of kind ; else, how could we know that there are even two things, matter and motion—the one a substance, the other something else ? The question, therefore, is altogether one of degree. It is not whether, if there be any substances and motions different in kind from one another, we have any means of ascertaining which precisely they are ; but, rather, whether the means of attaining a knowledge of specific differences which we undoubtedly possess, has been properly applied in the investigation of inorganic matter, vegetables, animals, and men. In other words, the question to consider is, whether prudence does not dictate to us the advisability of waiting before pronouncing a definite judgment on these four great classes of beings.

But can we afford to wait? And is there not the same reason for delay in every possible case for decision? Are scientific men to come to no definite conclusion till the Greek Calends, when they shall have experimented on every possible individual? Take, for example, the Principles of Conservation, and ask our physicists whether they feel themselves bound in prudence to be cautious before committing themselves definitely to these principles, lest some future experimentalist should discover a means of annihilating or of creating matter. Or ask an insurance agent whether he should not abstain from guaranteeing annuities, lest people now living should turn out to be immortal, though all who lived heretofore have died. Who would hesitate to build a mill, merely for fear the water would not turn the wheel, or the earth not support the structure? Yet, mistakes have occurred in such matters; men have sunk in quagmires which they thought perfectly solid ground; and water has not run where it was expected there would be no difficulty. And it might be urged that therefore we have no guarantee that in any given case our observations may not have been at fault.

Of course, mistakes have been made. People have supposed things to be utterly dead which we now know to have been full of life, and *vice versa*; what we know to be animals have been taken for plants; and it is often found quite impossible to define the exact limits of species. So it is impossible to say where exactly the atmosphere terminates, or where all matter ends and pure space begins, or what precisely is the form of an electric current. But are we therefore to deny that there is any such thing as atmospheric air or matter; to doubt as to whether the earth's atmosphere fills all the interstellar regions; or to assert that there is absolutely no form to a current of electricity? I have read

statements to the effect that vegetables do not differ from animals, for the sole reason that there is no possibility of exactly defining the limits of the two kingdoms. But, surely, although there are some things with regard to which we may not be certain whether they have or have not a self-conscious power of feeling, common-sense proclaims that horses and dogs feel, whereas grass and water do not feel.

It behoves a philosopher, above all things, to retain his common-sense. "Science puffeth up:" and after we have penetrated a little into the recesses where nature holds her secrets, we are tempted to set up our farthing candle as the universal and only truth. What we have not seen becomes then unknowable and non-existent.

Now, it is manifest common-sense that one may hesitate, as long as one likes, before committing oneself, in circumstances where there is no necessity for immediate action; but, when hesitation interferes with necessary action, it is downright cowardice and pusillanimity. As I have observed already, the man deserves to starve who cannot bring himself to take food, lest it should be poisoned; what greater evil than starvation can poison inflict? And physicists would be clowns and poltroons, if they never came to any universal conclusion, for fear they had not analysed individual cases in sufficient numbers. And if it should be that there is an Almighty Being who has revealed Himself in nature,—in life, sense, free-will, and all their specific differences; who, moreover, demands from men, His creatures, the service which, in the hypothesis of their creation by Him, is undoubtedly His due; how He must detest the prudence that exposes itself to the supreme danger of neglecting this awful service, for fear lest the whole human race throughout its history, should not have sufficiently experimented on inorganic matter, vegetables, animals,

and men, before coming to the conclusion that they are specifically distinct. And how that Supreme Intelligence must wonder at the inconsistency of the timid creature, who thus displays so much caution before committing himself to the divine service, but is not in the least afraid to define dogmatically that we must not serve ; nor to call on the whole world to admire the ingenuity with which he has made the grand discovery, that two things and two only—matter and motion—are distinct specifically ; and that as regards this dogma there can be no apprehension of the insufficiency of his observations on individuals.

III.

I feel that scant justice has been done in the foregoing outline, to an argument that covers the whole ground of Physics and Metaphysics. It is not, however, introduced into this Essay for its own sake, so much as to illustrate the difficulties to which Theists are exposed by reason of the dynamic theory of activity. I will, accordingly, proceed to specify and illustrate some of the difficulties to which I refer.

1. What if an Evolutionist were to put the following objection to the argument I have just outlined ?—The Principle of Improductibility is either universal or it is not. If it is not universal, Theists have got to show reason why, whereas some things may be produced by material agents from nothing, new forms cannot be produced ; especially the three species just referred to—life, sensation, and free-will. If, however, the Principle be absolutely universal, as would seem most reasonable, then it proves beyond question that neither these three nor any others are really new species ; for they were at one time produced by material agents, and some of them

are being daily produced even now. What the Schoolmen unanimously recognise as distinct species, are being constantly produced *de novo*; therefore, the whole theory of specific differences is but one of the many metaphysical errors which St. Thomas and his disciples drew from the exploded Physics of the Stagyrte.

That species are produced *de novo* is one of the common-places of chemistry. Every chemical composition and analysis results in new species. An electric current passed through a vessel of water produces oxygen and hydrogen. With every breath one draws, oxygen is taken into the lungs, where it unites with the carbon which it finds in the blood, to produce carbonic acid. To even a greater extent than the lungs the stomach is a regular chemical laboratory, where new substances, at least according to the Aristotelic theory, are being constantly generated. The same may be said of every organ of the body, inasmuch as each produces the waste matter which it gives off.

Now, carbonic acid is not a *mixture* of carbon and oxygen, at least according to the teaching of the advocates of specific differences; neither does water contain within its substance the oxygen and hydrogen forms which result from the electric current. Here, then, are substances, forces, motions, produced *de novo*, and, as Dynamists so strongly contend, by the action of material agents. With what consistency, then, can they hold that the material universe is unable to produce them? And conversely, if the forces of matter can produce these realities, is it not manifest that the specific distinctions of the inorganic world can no longer be maintained? And if in the inorganic world specific differences must be abandoned, notwithstanding the common-sense and the unbroken traditions of mankind, may there not be sufficient reason for refraining from

committing oneself definitely to the doctrine of specific differences between the higher and the lower classes of living things?

For, living forms are found to be incessantly produced everywhere in the world around us. Plants produce plants ; animals generate animals. And be it well remembered that when the Schoolmen discuss the question as to whether the parent plant or animal co-operates in the production of its offspring, not merely by modifying the extension of first matter, but by immediately and physically producing the substantial form, the received theory among them is, that the parent's action is immediately terminated in the new substance. This doctrine is, as we have seen,¹ relied on by Dynamists to prove their main contention—that by mere motions, without “forces,” material things could not produce the effects they do.

2. Theistic Dynamists will, no doubt, reply to the foregoing, that, when arguing against evolution, they do not base their proofs on the principle that the material universe is unable to produce *any* new form ; but rather on the proposition that *lower* forms, however they may contribute to the production of others like themselves, are quite incapable of generating species of an altogether *higher* order. Oxygen and hydrogen may produce water, and the action of fire may generate carbonic acid from the carbon of the fuel and the oxygen of the air. Similarly, vegetables and animals beget others like themselves ; but no scientific man now admits that vegetables are generated spontaneously from dead matter ; nor has anyone ever heard either of an animal being born of vegetable parents, or of a higher species of animal or vegetable being generated by those of a lower order. Accordingly the argument against

¹ See ch. xiii.

the Evolutionists is from the production of life, of animals, and of man, where before were respectively but inorganic matter, vegetables, and brutes. The species of material things were produced in a series, the terms of which ever ascended higher and higher in the scale of being ; and no mere material thing can produce any form higher than its own.

(a) With regard to this mode of stating the Theistic argument, it is to be remarked, in the first place, that it involves a complete departure from the old principles of the Schoolmen, according to which substances are always generated by such as are like or superior to themselves. The axiom, *like cause like effect*, can no longer be maintained in the light of chemistry ; and, possibly, if the disciples of Aristotle were aware of its falsehood, they would have modified their views with regard to the incapacity of inferior forms to produce those of a higher kind.

(b) As a matter of fact, do we not sometimes find, that in accordance with the regular order of nature, higher species are produced by others of a lower grade? Take, for instance, the well-known case of the development of the frog. The tadpole, which first comes from the egg, is in all essential respects like a fish ; it has the heart and gills of a fish, and propels itself by means of a finned tail. After a time lungs are developed, the gills disappear, so does the tail, which is replaced by legs ; and the animal has reached the higher amphibian stage.

Nor is this process of development peculiar to frogs, newts, and such things,—as was known even to Aristotle and the Schoolmen. One of Fr. Harper's propositions¹ is as follows :—

“ St. Thomas teaches that in embryos generally there is a progressive development of being, so that each embryo passes

¹ *Metaphysics of the School*, prop. 195 ; vol. ii. p. 553.

through the gradations of life inferior to its own, by virtue of successive Forms which are provisional and transitory. In particular such is his explicit teaching with regard to the human embryo. This theory is not unsupported by facts of physical experience."

In illustration of the teaching of the Angelic Doctor, the following passage is quoted :—

"In the generation of an animal there appear diverse substantial forms ; since there first appears the generative element, and afterwards the blood, and so on till there is the Form of a man or of an animal. Accordingly, such generation is necessarily not simple, but embracing within itself several generations and corruptions. For it is impossible that one and the same substantial Form should be gradually evolved into act, as we have shown. Thus, then, by the formative virtue which at the commencement is in the generative element [the sperm cells], the Form of the generative element is expelled and another Form introduced ;—this latter expelled, another may be afterwards introduced ; and in this way first the vegetative soul is introduced ;—afterwards this latter is expelled, and a soul that is sensitive at once and vegetative is introduced ;—this last expelled, a soul which is rational at once and sensitive as well as vegetative is introduced, not by the virtue aforesaid, but by the Creator. Accordingly, it is to be affirmed in consonance with this opinion, that, previous to the possession of a rational soul by the embryo, it lives and possesses a soul, on the expulsion of which a rational soul is introduced "1

"1 In generatione autem animalis apparent diversae formae substantiales; cum primo appareat sperma, et postea sanguis, et sic deinceps quousque sit forma hominis vel animalis. Et sic oportet quod hujusmodi generatio non sit simplex, sed continens in se plures generationes et corruptiones. Non enim potest esse quod una et eadem forma substantialis gradatim educatur in actum, ut ostensum est. Sic ergo per virtutem formativam quae a principio est in semine, abjecta forma spermatis, inducitur alia forma; qua abjecta, iterum inducatur alia; et sic primo inducatur anima vegetabilis; deinde, ea abjecta, inducatur anima sensibilis et vegetabilis simul; qua abjecta inducatur non per virtutem praedictam sed a creante, anima quae simul est rationalis, sensibilis, et vegetabilis. Et sic dicendum

In proof of his contention that "this theory is not unsupported by facts of physical experience," Fr. Harper summarizes a "systematic survey of the periods in human germ-history" given by Professor Haeckel in his work on the *Evolution of Man* :—

"The following are the headings : 'FIRST MAIN DIVISION OF GERM HISTORY. Man as a simple plastid.—*First stage* : Monerula stage. *Second stage* : Cytula stage. SECOND MAIN DIVISION OF GERM HISTORY.—*Third stage* : Morula stage. *Fourth stage* : Blastula stage.' As yet there is no even rudimental development of any organ in the embryo. 'THIRD MAIN DIVISION OF GERM HISTORY.—*Fifth Stage* : Gastrula stage. *Sixth stage* : Chrodonium stage.' In the former the embryo consists of two germ-layers that give promise of an intestine and a mouth ; in the latter, it 'possesses, in all essential points, the organization of a worm,' apparently under a rudimentary form. 'FOURTH MAIN DIVISION OF GERM HISTORY.—*Seventh stage* : Acranial stage,' the head not being distinctly separated from the trunk, and the brain-bladders not yet developed. '*Eighth stage* : Cyclostoma stage ;' in which there appears the commencement of a rudimentary brain, as also the rudiments of three sense organs (eyes, ears, and nose), but jaws and limbs are wanting. '*Ninth Stage* : Ichthyod stage,' so called, because the embryo 'possesses, in essential points, the organization of a fish.' The arms and legs, that are to be, appear like fins, and the rudiments of an upper and lower jaw begin to show themselves. '*Tenth stage* : Amniotic stage,' wherein the embryo exhibits all the essential organization of a vertebrate ; then gradually acquires 'the form peculiar to the Mammals, and at last the specific human form.' Why all this latter, and by far the most important, process of development has been huddled together under one *Stage*, is not difficult to discover, if we have regard to the principal aim of the writer [Haeckel] ; but it is scarcely scientific." ¹

est secundum hanc opinionem, quod embryo, antequam habeat animam rationalem, vivit, et habet animam, qua abjecta, inducitur anima rationalis " Po. q. 3, a. 9, ad. 9.

¹ *Ibid*, p. 558.

What happens in the case of the human embryo is but what occurs in the process of development of the inferior species of animals,—a gradual progress from lower to higher forms. Remark, moreover, that according to the teaching of St. Thomas, each successive form, with the exception of the rational soul, is a true product of its immediate predecessor in the embryo. “By the formative virtue which at the commencement is in the generative element [the sperm cells], the form of the generative element is expelled and another Form introduced : . . . this last form expelled, a soul which is rational at once and sensitive as well as vegetative is introduced, not by the virtue aforesaid, but by the Creator.” In accordance, therefore, with the teaching of St. Thomas, it is impossible to maintain the principle that higher forms of matter cannot be produced by their inferiors.

IV.

But, it will be urged, at least there are two stages, the first and the last,—the production of the first living substance and also of the rational soul,—in which it is manifest that matter does not co-operate. The theistic argument against Evolution is thus reduced to deal with two links only in the chain of the world's history : let us see how Dynamists prove their contention even with regard to these.

I. First, as to the origin of life. As far as anyone now knows, living forms have not been produced from inanimate matter for many millions of years. A time was, however,—many ages ago,—when some form of life appeared in the material universe for the first time. It made itself manifest for the first time on the earth, at any rate ; and we may disregard the supposition of a germ having been brought here by a meteor or in some

similar way. How was it produced? Dynamists rightly contend that the hitherto inanimate matter of the earth could not have generated it. But why?

Because, they say, life cannot now be produced from inanimate matter. To this argument the Evolutionists reply that the inability of matter at present is due, not to a want of power in inanimate nature to produce living forms, but rather to a lack of the necessary conditions. In this connection the late Mr. Huxley wrote :—

“ If it were given me to look back beyond the abyss of geologically recorded time, to the still more remote period when the earth was passing through physical and chemical conditions, which it can no more see again than a man can recall his infancy, I should expect to be a witness of the evolution of living protoplasm from not living matter.”¹

And, surely, it is not unreasonable to contend that the conditions prevailing on earth when the first living germ was produced, were such as we cannot now provide ; and that, if we could secure them, generation would follow as naturally as in the instant when the first germ appeared on the planet.

Moreover, reasons are not wanting which go to show that such high authorities as St. Augustine and St. Thomas are of the same mind as the Agnostic Professor. The Angelic Doctor writes :—

“ In the opinion of St. Augustine, when it is said, ‘ let the earth bring forth the green herb,’ it is not meant that plants were then produced actually and in their proper nature ; but that then there was given to the earth [inanimate hitherto], *a germinative power to produce plants* by the work of propagation ; so that the earth is then said to have brought forth the green herb and the tree yielding fruit, in this wise, viz., that *it received the power of producing them*. And this he confirms by the authority of Scripture, where it is said, ‘ these are the

¹ *Critiques and Addresses*, page 239.

generations of the heavens and the earth when they were created, in the day that the Lord God made the heavens and the earth, and every plant of the field, *before it sprung up* in the earth, and every herb of the ground *before it grew.*' . . . Prior, therefore, to their actually arising over the earth, they were made causally in the earth.

"*This view is likewise confirmed by reason.* For, in these first days God created the creature either in its cause, or in its origin, or in act, in the work from which He afterwards rested. Nevertheless, He subsequently until now works according to the administration of created things by the work of propagation; because it suffices for their production that they have the power of the heavenly bodies, as it were, for their father, and the efficacy of the earth in place of a mother. Therefore, plants are not actually produced on the third day, but only causally."¹

Here, then, we have St. Thomas teaching from St. Augustine and the Scriptures not only that matter could produce life in the conditions prevailing at the time when living germs first appeared, but that the first living form was actually so produced by inanimate nature. Nay more, this result was in accordance with what

¹ "Secundum Augustinum, cum dicitur, 'producat terra herbam virentem,' non intelligitur tunc plantas esse productas in actu et in propria natura, sed tunc terrae datam esse virtutem generativam ad producendum plantas opere propagationis; ut dicatur tunc taliter produxisse terra herbam virentem et lignum pomiferum, idest producendi accepisse virtutem. Et hoc quidem confirmat auctoritate Scripturae, Genes. 2, 4, ubi dicitur: 'Istae sunt generationes caeli et terrae quando creatae sunt, in die quo fecit Deus caelum et terram, et omne virgultum agri antequam orietur in terra, omnemque herbam regionis priusquam germinaret' . . . Ante ergo quam actu orirentur super terram, facta sunt causaliter in terra.

"Confirmatur hoc etiam ratione; quia in illis primis diebus condidit Deus creaturam originaliter, vel causaliter, vel actualiter, a quo opere postmodum requievit; qui tamen postmodum secundum administrationem rerum conditarum per opus propagationis usque modo operatur. Producere autem plantas in actu ex terra ad opus propagationis pertinet; quia ad earum productionem sufficit virtus caelestis tanquam pater, et virtus terrae loco matris; ideo non fuerunt plantae tertia die productae in actu sed causaliter tantum." De Pot. q. 4, a. 2, ad 28. Cf. i. q. 69, a. 2. The translation in the text is Father Harper's: l. c. p. 740.

St. Thomas, after St. Augustine, calls the *semina es rationes* possessed by matter from the beginning; which seem to have been made natural and due to it on certain conditions, and which in any case do not appear to have been ever recalled. St. Thomas nowhere hints that matter has not now the same *rationes seminales* which it had before the process of evolution began. On the contrary he supposes them to continue to the present time, and expressly affirms that the lower animals generated when putrefaction takes place, owe their substantial forms to the influence of heavenly bodies, which must therefore retain the *seminales rationes* whereby they can produce life out of inanimate material.¹

Of course, we know now that there is no need of this celestial interference: that, however, is beside the point with which I am dealing here. The question now is whether the *seminales rationes* with which inorganic matter was originally endowed, and by means of which it could in certain conditions dispose itself for the reception of living forms,—whether this disposing power was natural or preternatural. There is very good reason to believe that it was natural to matter in certain conditions, and consequently that it is as permanent as nature itself.

If this be so, it follows that if physicists could now reproduce the conditions that prevailed so many ages ago, the material so conditioned would spring into life as at the beginning. And, thus, what becomes of the theistic argument that the “forces” of inanimate matter are not, and therefore were not, able to produce living forms, forces, and motions?

¹ “In animalibus ex putrefactione generatis sufficit sola virtus caelestis corporis quae etiam in semine operatur . . . Virtus enim caelestis corporis in inferioribus corporibus relinquitur, in quantum ab eo transmutantur sicut a primo alterante.” *De Pot.* q. 3, a. 11, ad 12.

2. There remains to the Dynamist just one position to fall back upon, the production of the human soul. This, at least, could not have been produced by any antecedent form in the foetus. For, there is this great difference between rational souls and those which are irrational ;—the former are capable of subsisting apart from matter, whereas the latter, when separated from matter, must immediately cease to be. The rational soul, therefore, is *created*; and no mere creature can ever be made capable of a true creative act. The “forces” of creatures, though but “forces,” can produce the semi-substantial lower forms ; but no mere “force” or motion—no accident of any kind—can be terminated in a full substance such as the soul of man.

It may avert misapprehension if I state here my own firm conviction that no mere creature can, even by the power of the Almighty, be endowed with the capacity of creating rational souls. The reason that weighs most with me is, that the action of every conceivable creature is necessarily a mere motion ; and the term of motion is an accident not a substance. This applies to all substantial forms, whether they are capable of existing apart from matter, as is the human soul ; or cannot enjoy a separate existence, as happens in cases of inferior forms.

The electric current modifies the extension of the water through which it passes,—shakes its particles asunder, as it were ;—with the result that the substantial form of water is no longer suited for the first matter with its new extension ; hence that form must cease to be sustained in existence by God, Who is thereupon bound to produce other forms in its stead. The electric current causes *dispositions*, but God alone produces the *substances*. So it is when vegetable and brute forms are generated ; and it is not different in

the case of the development of man. The action of the human parents disposes the embryo for the reception of a rational soul; and God has so ordained that He will infuse a rational form into the foetus when the matter is sufficiently disposed for the reception of such a form. This is the opinion I have advocated already.¹

Now, those Dynamists who admit the doctrine of substantial forms, contend that the "forces" of created agents produce such forms as may be called material, but are incapable of even receiving from God the power of creating a spiritual soul. This is their position against the Materialistic Evolutionists; and it is this position which they are called on to justify on pain of the collapse of the entire theistic argument from the production of species.

(a) They are wont to argue that there is an infinite distance between mere nothing and a human soul, and that such a chasm could be bridged over only by an exercise of infinite power :—

"Between nothing and finite being, there is an infinite distance, not by reason of the thing produced, . . . but by reason of the *term from which* [the action sets out]. For, you cannot find any beginning to this distance; but if there is no beginning, the distance is infinite in that direction. Such a distance can be passed over only by infinite power."²

Now, it seems to me most reasonable to say that a mere nothing is in a true sense infinitely removed from

¹ See chapter XIII. iii.

² "Infinita distantia inter nihilum et esse finitum non est ratione rei factae, . . . sed ratione termini a quo; quia nequit reperiri unde incipiat illa distantia, atque ita nunquam incipit; sed si nunquam incipit, ex parte termini a quo est infinita. . . . Distantiam . . . assignatam possibile quidem est pertransire, sed nonnisi per virtutem infinitam" Mazzella, *De Deo Creante*, prop. 5, n. 115.

reality. An infinite number of noughts contains no more reality than one nought; and, similarly, potency being, as such, void of reality, must ever remain a mere potency, until it gets reality from outside itself.

But is "force" a mere potency? Is it not able, according to the Catholic Dynamists, to co-operate in the production of the lower substantial forms? Surely, a mere nothing cannot positively co-operate in the production of realities.

Moreover, if the fact of the term of departure being nothing in the case of the creation of a spiritual soul, is sufficient to render the chasm to be bridged over wide as infinity in that direction; is the distance not equally infinite in the case of the production of the soul of a beast? The soul of a beast is something, and is produced from nothing; for, the potentiality of matter out of which it is said to be drawn, as was pointed out in a previous Chapter,¹ is merely a passive capacity that matter has of sustaining the form when it is produced.

Consistency, therefore, requires us to hold, either that there is not an infinite distance between nothingness and any finite unit, and accordingly that there is no creature which may not be produced by the force of another; or to maintain that there is such an infinite distance in the case of the least reality, substance or accident, force or motion; and that, consequently, no creature, no matter how perfect, can produce another from nothingness, or even perfect itself in the least, unless in so far as it receives reality from some other external agent.²

¹ Chapter XIII. i.

² It does not follow from the argument in the text that created agents, considered as under the divine premotion, are as capable of producing spiritual souls, or other substantial forms, as they are of causing motions in material things. Substantial forms are *produced from nothing*; motions are not so produced, but only *communicated*, after being received. It is quite as difficult for a creature to move before it is moved from without, by God

It is by the latter alternative we prove the necessity of the divine premotion, as also of the conservation by God of all creatures in existence. And thus we find, that as a consistent Dynamist should not admit the necessity of divine co-operation in the actions of creatures, so he is bound in consistency to his principles of activity, to hold the possibility of creation by other agents than by God.¹

(b) Another argument is sometimes relied on to prove that though the "forces" of material agents produce the lower substantial forms, the human soul must be created by an exercise of infinite power. This argument is given by Zigliara as follows :—

"Between the nature of an effect and the causality of its cause, there ought to be such a proportion as would refer the more universal effects to the more universal and prior causes. But, of all effects the most universal is *being* itself. Hence, it should be the effect of the first and most universal cause, which is God. But to produce *being* absolutely, not inasmuch as it is of this or that quality, belongs to the nature of creation. Hence, creation is the act of God alone."²

or by some creature acting under His impulse, as it is for it to create a rational soul. Once, however, that a creature has got motion, it can communicate it in certain conditions. Substantial forms are not capable of being thus communicated, according to the present order of Providence; neither are vital motions. I do not see why, in the case of either, the reverse should be absolutely impossible;—that, for instance, God should not be able to empower a man to communicate his soul to a beast, or to a marble statue. Even in the present order we find no difficulty in communicating part of our *matter* to another; we cannot, however, produce new matter any more than a new soul, or force, or motion, or any other reality.

¹ Fr. Liberatore's principle will be remembered :—"Nulla res sine locupetitoris causae adminiculo largiri sibi potest id quo ditior in realitate fit, et a potentia reducitur in actum." See Chap. VI., page 96.

² "Inter naturam effectus et causalitatem causae debet esse talis proportio ut necesse sit universales effectus in universales et priores causas reducere. Inter omnes autem effectus universalissimum est ipsum esse. Unde oportet quod sit proprius effectus primae et universalissimae causae, quae est Deus. Producere autem esse absolute, non in quantum est hoc

If one may be permitted to criticise what has so much authority to support it, I would make one or two remarks in reply to the foregoing.

First, with regard to the principle which asserts that "the more universal effects should be referred to the more universal and prior causes," it does not commend itself to my judgment, at least without a distinction. The *greater* the effect,—the more of reality or entity it has,—the greater, more powerful, more real, ought its cause to be. In this sense the principle is manifestly sound. It does not, however, appear to be equally clear that the more "universal"—that is, apparently, the more indefinite—a being or shade of being is, the more universal and indefinite, or even the more perfect, ought its cause to be. Universality or indefiniteness is not a perfection, but the reverse. To *be* is not so much as to *be alive*; nor is this, in turn, so much as to *be an animal*; nor to be an animal so much as to *be a man*; nor even to be a man so complete as to be *this* man. One sees clearly that the perfection of causes ought to be in proportion to the importance of their effects; but, inasmuch as universality is the reverse of reality, it is not so easy to perceive how cause and effect should be proportionate in that respect.

Moreover, though it is quite true that "of all effects the most universal is being itself;" and, equally, that "the first and most universal of causes is God;" yet it is not quite obvious that this effect and this cause are first and most universal in precisely the same sense. Being is first and most universal as containing fewest lines of reality; God, as containing most, nay all possible lines Ontologists used to confound absolute being, the

vel tale, pertinet ad rationem creationis, ut ex dictis est manifestum. Igitur creatio est actio propria solius Dei." Cosmol. 7, iii.; the extract is almost in the words of St. Thomas, 1, q. 45, a. 5]

transcendental, with the Absolute Being, who is also the first and most universal cause. They are not the same being. Now, as it is the transcendental only which is found in creatures, a cause proportionate to it would appear to exist outside God in every reality. Or, to put it in another way, as transcendental being is the least of entities, so, instead of requiring the greatest of causes, it demands but the least,—an amount of reality such as must be found in everything that exists.

If, therefore, as Dynamists contend, material agents are able, by their “forces,” to produce substantial forms similar and sometimes even superior to their own ; how will it be proved from reason that a special intervention of a Higher Cause is needed, as each human soul is brought into existence ; nay even when, as the Evolutionists contend, the simian form first generated a rational soul ?

I understand and appreciate the position taken up by the scientists : the material universe cannot produce anything, but only communicate what it has ; hence, nothing is ever produced *de novo* in the world. This second assertion may not represent the fact ; I am quite persuaded that it does not ; but it represents a consistent view. It does not, however, seem to me to be consistent, to maintain on the one hand, as so many Catholic writers do, that material agents are endowed with “forces” whereby they may really produce substantial forms from potentiality ;—may even bring into existence, as in the development of the human embryo, forms higher than their own ;—but that the process must stop short at spiritual substances ; as if these contained some infinity of being, out of all proportion to the perfections of other creatures.

There is, indeed, a spirit which is the term of an infinite act of generation,—the divine substance, as

subsisting in the Second Person of the Blessed Trinity. It is a first and most universal Principiate, in the same sense precisely as the Father is a first and most universal Principle; and as such It requires Him from Whom alone It can proceed. But I fail to see in what sense transcendental being is universal, so as to exclude all creatures from participating in its production,—even those which are superior to it in the scale of reality. I fail to see this, on the hypothesis of the Dynamists,—that material agents do really produce, by means of their “forces,” entities much more definite and of a much superior grade.

It will be said, I have no doubt, that, according to the dynamic theory, material agents do not produce substantial forms by their own “forces” merely; they *co-operate*, rather, with the divine activity in the act of production. Hence, it will be argued, a Dynamist might contend, not inconsistently, that of itself and without the divine assistance, the material universe was unable to generate the new forms as they arose.

This brings us back once more to the question of co-operation:—how it can be proved that created agents, the “forces” of which, according to the dynamic theory, operate concurrently with the divine energy in producing new qualities and forms, are not sufficient of themselves, by these same “forces,” and without any divine assistance, to produce the same effects. Evolutionists are allowed to take for granted that matter has within its bosom something whereby it may contribute positively to the production of new realities. Those who make this admission are careful to add that these “forces” of matter can only *co-operate* with others, and cannot act of themselves. This is said, but how is it to be proved, when the first fatal admission has once been made.

I do not know of any principle from which the necessity

of divine co-operation can be deduced with anything like certainty, except that which the Catholic philosophers have learned from St. Thomas : “ No being can, without the aid of a wealthier cause, give itself that whereby it becomes richer in reality, and is reduced from potentiality to act.”¹

This is intelligible ; it is, as has been observed, the Principle of Conservation of the physicists, extended to the utmost length of which it is capable. If it be true of matter, it applies equally to form, to motion, and to every other accident ;—for all are realities. And if it holds with regard to independent production, it just as surely excludes any positive co-operation or partial efficiency. He who contributes positively out of his own resources, does *something* without assistance,—the thing, namely, which he contributes. And so, if the Dynamists’ contention were true, and natural agents could co-operate with God in the production of realities, the principle would be violated ; and I know not how it could be proved against Evolutionists, that though matter *contributes* to the production of new species, it is unable to produce them without the aid of a higher power.

VI.

Taking the kinetic view of the nature of activity, the controversy between us and the Materialists is greatly simplified. Both parties would thus admit the important principle that the material universe is utterly incapable of producing any new substance, or motion, or reality of any kind. These, therefore, if generated at all, must be infused into the world by a Superior Being. The question, accordingly, is altogether one of fact ;—have any new substances or motions been produced at any time ?

¹ See Chap. vi, page 96.

We appeal to every department of science to supply an answer to this question ;—to the origin of life, of sensation, of reason. We appeal in a special manner to vital actions and to the free motions of the human will. That there are such realities we believe to be the testimony alike of science and of common-sense ; and we are no less convinced that the Schoolmen were right in holding that vital motions are produced *de novo* in the faculties in certain conditions, and that the will can annihilate its free actions or continue them at pleasure.

Here, then, we have production and annihilation both ; of forms and vital motions, but not of mechanical movement nor of matter. And as the material universe is admittedly incapable of producing the least reality, it follows necessarily that there must be outside it a Prime Mover and Producer, by which its potentialities are reduced to act.

Nay, is there not an incessant production not of vital motions and of forms only, but of mechanical movement and even of matter itself? God could not create a world and set it in motion, leaving it for the future to work out its own destiny. For, just as a being in pure potentiality cannot get existence except from without ; so neither can an existing but contingent being give itself a continuation of existence. For such a being existence at any instant is only a potentiality of existing in the next instant ; it is more—twice as much—to exist for two successive instants, than it is to exist for the first alone. And if no being can give itself, but must get from another, any increase in its reality ; it follows plainly that the material universe, which is essentially contingent in its nature, must pass immediately into

¹ A contingent being is one which does not exist by reason of its essence. The test of contingency is, that the essence remains the same although it be

potentiality, unless it get from some "wealthier cause"—to use Fr. Liberatore's expression—each successive instant of existence ;—every single moment of reality it may possess. Thus God reveals Himself in nature as the Conserver or continual Creator of every substance, faculty, motion, and shade of reality : "in Him we live, move, and have our being ;" "the heavens and the earth are full of His glory ;" "of Him, and by Him, and in Him, are all things ; to Him be glory for ever."

NOTE TO CHAPTER XVII.

The incessant intervention of God as the great Conserver of motion, is manifested perhaps most plainly in the phenomena of resistance. Why does a ball rebound from a slab ? Certainly the rebound is due to the activity of some agent. But the slab does not act when it resists the progress of the ball ; at least, it does not act in so far as it resists. (See Chapter X.) Therefore there must be some other agent at work, causing the ball to rebound ; and, except God, what other agent can there be ?

Modern Physicists are wont to explain the phenomena of resistance by referring them to impenetrability, which, they are proud to inform us, is what they call "a property of matter." Ganot, the author of our College class-book, writes : "Impenetrability is the property in virtue of which two portions of matter cannot, at the same time, occupy the same portion of space." Why can they not ? Because matter is impenetrable, or impenetrability is a property of

supposed to be non-existent. Now, it is manifest—however Mr. Spencer may dissent—that we may and do suppose the material universe around us to have been once in a state of mere possibility ; nor is it a universe different from that which we see around us which we suppose thus to be without existence. Hence, the material universe is but a contingent being.

matter. In other words, masses of matter exclude one another because it is their nature to do so.

It used to be the practice of physicists—it may be so still—when explaining to their classes the common suction-pump, to indulge in a sneer at the Schoolmen, whom they conveniently represented as accounting for the rise of the water in the cylinder of the pump, on the principle that “nature abhors a vacuum.” Yet these same very sapient lecturers had no difficulty next moment in proceeding to account for the phenomena of resistance, by saying that “it is the nature of matter to resist”: nature, I suppose, abhorring penetration.

We want to know in what does this property of matter consist, which we call resistance or impenetrability. What is it? An action? force? motion? Are not all these properties of matter? It seems to me that the more inert, immovable, a piece of matter is, the more resistance it is endowed with. Therefore, resistance is not activity or action. What, then, produces the change in the direction of the motion of a mass to which resistance is offered? For a change there certainly is when a ball rebounds, and the new direction of the motion must have some efficient cause. Apart from divine interference is any one able to suggest even the shadow of a cause? The “properties of matter” are just like the “abhorrence of vacua,”—a nice phrase, which does not convey definite information. In modern Physics we expect something definite and tangible. In what, then, does this property of matter which we call impenetrability or resistance, consist?

CHAPTER XVIII.

ORIGIN OF MECHANICAL MOTION.

AN Essay on the Origin and Conservation of Motion should be very imperfect, if it were to leave untouched the question as to whether the mechanical motion of the universe ever had a beginning ;—whether, as this form of movement does not now commence or cease, it may not have always existed, subjected in and sustained by matter, which would thus be as eternal as the motion which it sustains. It would be difficult to over-rate the importance of this question. It seems to many of the defenders of Theism to lie at the very root of their philosophical controversy with the Materialists. Dynamists, in particular, as it appears to me, are in a measure forced by their principles to fall back on the impossibility of an infinite series, as the basis of all their philosophical refutations of Atheism. I purpose to devote this concluding Chapter to a consideration of the prudence of those who trust altogether, or in the main, to this method of defending the fundamental dogma of all religious belief.

It is almost unnecessary to state that all Catholics agree in holding it to have been revealed by God that the material universe, matter and motion, was actually and in time brought into being out of nothing. In this belief I fully participate. The question to be considered here is, not what we know from revelation, but what we may learn from science. Does science—I care not whether it be of Metaphysics or of Physics—inevitably lead us to the conclusion that the material universe, whether of matter or of motion, must of necessity have had a beginning in time? The question can be exam-

ined under the light either of extrinsic or of intrinsic evidence: I propose to examine the authorities in the first place.

I.

I begin by admitting that nearly all the Catholic philosophers who have treated of this question in modern times, have come to the conclusion that an infinite series of actual things or changes is an impossibility; and, accordingly, that the motions of the present material universe must have had a beginning. I submit, however, that this was not the teaching of the predecessors of these philosophers in the Schools; and I refer, in particular, to those who flourished from the middle of the thirteenth century down to the end of the sixteenth. Neither was it the opinion of Aristotle, the great master from whom the Schoolmen learned almost all their philosophy.

1. Aristotle held that the material universe was always in existence, and that the mechanical motion which it possesses had no beginning. Of course Aristotle was a pagan,—a Deist, if you will. He had not the advantage of the light of revelation, which has done so much to illumine the dark ways of philosophy. Moreover, he seems to have been absolutely without warrant from the natural sciences, in teaching not only that it was possible for the material universe never to have had a beginning, but that, as a matter of fact, it was always in existence. But when all this has been said, it still remains that the Philosopher *par excellence* was so far from thinking it impossible for matter to have been alway in existence and in motion, that he taught the very contrary. Yet, Aristotle believed in a Necessary Being, who, without being moved Himself, is the cause of all motion;—which goes

to show that his opinion as to the eternity of motion was not the result of prejudice, arising from Materialistic tendencies. And Aristotle's was probably the greatest intellect that ever was devoted to the study of nature. May it not be possible, therefore, that even now a philosophical mind, looking at the question from the point of view of reason alone, may remain unconvinced of the intrinsic absurdity of an eternal series of motions, without being either blinded by prejudice or blighted intellectual capacity?

2. The greatest of Aristotle's disciples, St. Thomas, does not seem, to say the least, to have been strongly convinced of the impossibility of motion having always existed in the universe. Of course there is a controversy as to what the Angelic Doctor's opinion really was. But the fact that there should be such a dispute, is proof enough that he had formed no very definite conviction, to say the least.

He has left us at least six dissertations¹ in which he discusses whether it can be proved from reason that the universe had a beginning; and his formal conclusion invariably is, that the inception of the world in time cannot be proved scientifically, but must be learned from revelation alone. He goes so far as to warn his disciples against the danger of attempting to prove the doctrine from science; "lest, presuming to demonstrate what is of faith, one should bring forward arguments which are not strictly conclusive, and which supply unbelievers with matter for derision."²

¹ *De Pot.*, q. 3, a. 17; *Contra Gent.*, l. 2, c. 38; *Opusc.*, 27 (al. 23); *Quodl.*, 3, a. 31; *In Sent.*, l. 2, d. 1, q. 1, a. 5; and *Summa*, l. q. 46, a. 2.

² "Hoc utile est ut consideretur, ne forte aliquis, quod fidei est demonstrare praesumens, rationes non necessarias, inducat, quae praebeant materiam irridendi infidelibus." (*Summa*, l. c. ad 7.)

In these dissertations the discussion turns for the most part on the possibility or impossibility of an infinite series. Most modern Catholic writers see no difficulty here. To them it is evident that the universe cannot have gone through an infinity of changes. Not so St. Thomas. What is almost a first principle to the moderns is to him a difficulty ; their argument in defence is relegated to the place of an objection in the works of the Angelic Doctor.

For a long time he made no distinction between one series and another ; simultaneous or successive infinity he regarded as equally possible. "It has not yet been proved," he writes, "that God cannot produce a number of things actually infinite"¹;—the things which he had before his mind being human souls simultaneously existing. Later on he modified this opinion, so far as to admit that things which exist simultaneously cannot be infinite in number ; but to the end he maintained the possibility of an infinite series in succession. In his very last dissertation on the subject he does not hesitate to write in this strain :—

"It is not impossible for man to be generated by man *in infinitum*, though it would be impossible, if the generation of this man were to depend on that man, and [at the same time] on the elementary body, and on the sun, and so on without end."²

The modern interpreters of the Saint, it is true, have seized on a remark which he drops incidentally towards the end of the same Article, and which proves, they contend, that the writer had before his mind all through,

¹ "Adhuc non est demonstratum quod Deus non possit facere ut sint infinita actu." *Opusc.* (23, al. 27, versus fin.)

² "Non est impossibile quod homo generatur ab homine in infinitum ; esset autem impossibile, si generatio hujus hominis dependeret ab hoc homine et a corpore elementari et a sole, et sic infinitum." (l. q. 46, a. 2, ad 7.)

not the actual world in which we live and move, but some possible universe which God might have created, and in which there would be neither motion nor change of any kind. But why, then, did he write, only a few sentences before, that "it is not impossible for man to be generated by man *in infinitum*"? Why admonish his disciples not to "presume to demonstrate what is of faith"? What has faith to do with this possible universe? It is altogether incredible that the holy Doctor, in dropping at the end of his Article this remark about a possible world, should have intended to retract not only all he had said in the five or more dissertations he had previously written, but what he had just penned in the Article he was then concluding.

Accordingly, his ablest and most faithful disciples agree that to the end he remained convinced of the impossibility of proving from reason the actual inception of any species in the world, man only excepted. This is the opinion of Capreolus,¹ Hervaeus,² Ferrariensis,³ and Cajetan;⁴ of whom the last two have been described by the present Pontiff as "copious streams, through which the doctrine of St. Thomas has come down to us."⁵ It was thus the Angelic Doctor was understood by all the ancients, including those who belonged to the Dominican household, down to the time of Sylvius.

What caused the change that set in then and has continued ever since? Possibly, the adoption of the dynamic theory; which, in the then state of physical science, made it necessary to fall back on the impossibility of an infinite series, for proof of the existence of a Mover distinct from the universe of matter. For

¹ *In Sent.*, I, 2, d. 1, q. 1,

² *In eundem locum.*

³ *Contra Gent.*, I, 2, cc. 38, 81.

⁴ *In I. q.* 46, a. 2.

⁵ See p. 44.

those who felt compelled to rely on this line of defence, it would, of course, be very inconvenient to have to admit that the two greatest exponents of the Peripatetic philosophy, Aristotle and St. Thomas, agree in repudiating the principle on which the argument is based.

3. I can but refer very briefly to the teaching of the Schoolmen who flourished after the death of the Angelic Doctor. They may be divided into two classes,—Dominicans and others; the Dominicans being grouped apart, as being more likely to be influenced by the authority of St. Thomas.

(a) Of the earlier Dominicans four have been already referred to,—Capreolus, Hervaeus, Ferrariensis, and Cajetan. They are, I believe, after St. Thomas, the four greatest names among the writers of their school; and they are agreed, not only that their Angelic master remained to the end convinced of the impossibility of proving from reason the inception of mechanical motion, but also that this is the true opinion. Cajetan, moreover, expressly tells us that it was the recognised teaching in the Thomistic schools:—

“The Thomists are cautious in admitting that the world may have existed from eternity, acknowledging that it may have been so as regards the substance of the universe, consisting of the five simple bodies. They admit, even, that the world may have existed from eternity, as regards *the motion of the heavens, and all generations*, with the exception of the generation of man.”¹

Here Cajetan represents the Thomists generally as committed to the view, that, as far as reason knows

¹ “Cauti sunt Thomistae in concedendo mundum potuisse esse ab aeterno. Concedunt mundum quoad substantiam, constantem ex quinque corporibus simplicibus. Concedunt etiam quoad motum coeli, et generationes omnes, praeter humanas.” (In loc. jam cit.)

motion may have existed in matter from all eternity. Surely, Cajetan must have known what was the received doctrine in the Dominican schools in the era that preceded the Council of Trent.

Of the writers of same order who flourished during this period, four others of great name are usually referred to in connection with this question of the eternity of motion,—Durandus, Dominic Soto, Nazarius, and Soncinas. It may be of interest to learn what were the opinions of these.

Durandus and Soto differed with their brethern,—as was, indeed, not unusual with either ; Nazarius and Soncinas adhered to the teaching of St. Thomas. But even Soto drew a distinction between continuous local motion and interrupted generations ; and admitted that motion, if continuous, may never have had a beginning. Accordingly, of all the Dominican philosophers and theologians who flourished from the time of the Angelic Doctor to the end of the sixteenth century, Durandus alone maintained that the inception of the mechanical motion of the universe can be proved scientifically. And what even he thought of the argument from the impossibility of an infinite series will be manifest from the following extract :—

“ The second and third reasons [from the impossibility of adding to infinity] are not valid, although the conclusion is true. Because, although there cannot be an addition to infinity, in so far as it is infinite, there is nothing to prevent an addition to infinity, on the side at which it is not infinite. For instance, if we suppose a column to be infinite in length, something may be added to its breadth, but not to its length. But if we were to suppose a body to be infinite in all directions, nothing at all could be added to it. In like manner, granted that motion was always in existence, it would not have beginning of duration. Nevertheless, it has a term in the direction of the future.

For, we can now determine the last revolution that took place. And, therefore, to the past nothing could be added, since it was infinite; but in the direction of the future something can be added continually, and is added every day." ¹

With the later Thomists it was different. Bannes sided with Durandus against the Angelic Doctor; he was followed by Sylvius, John of St. Thomas, Billuart, and the rest. Most of them sought to hide their desertion even from themselves, by pleading that the teaching of St. Thomas had been misrepresented by his earlier disciples. I know not what could have led to this change of front on the part of the Dominican body, if it were not that at this time, for fear of being charged with Calvinism by the Jesuits, they had begun to advocate dynamic principles. Certainly, the writings of Suarez had then produced in the schools a current of thought which was in great measure opposed to the teaching of St. Thomas. It is suspicious, to say the least, that the change of opinion in the Dominican schools on the question of the possibility of an eternal universe in motion, should synchronize with the publication of the works of Suarez, as well as with the famous controversies *De Auxiliis*.

(b) Of the other theologians and philosophers who have left us dissertations on the same question, those who belonged to the Franciscan order do not seem, as a rule,

¹ "Secunda et tertia [rationes] non procedunt, quamvis conclusio sit vera, quia licet infinito secundum quod infinitum non possit fieri additio, nihil tamen prohibet quominus infinito ex parte qua non est infinitum possit aliquid addi. Verbi gratia, si ponamus columnam infinitam secundum longitudinem, possit ei aliquid addi secundum latum, sed non in longum. Si autem poneremus corpus undequaque infinitum, nihil omnino posset ei addi. Similiter, dato quod motus semper fuisset, nec habuisset durationis initium (habet tamen a parte post durationis terminum. Possumus enim nunc signare ultimam revolutionem quae fuit). Et ideo ante nihil posset addi, quia infinitus esset. Sed a parte post continue aliquid potest addi et additur quotidie." (*In 2 Dist. 1, q. 3, n. 21.*)

to have held decisive views. This, in itself, is not without significance, seeing how prone Scotus and his disciples were to find matter for dispute in the writings of the Angelic Doctor.

This last remark does not, of course, apply to St. Bonaventure. He differed from his saintly friend on the general question of the possibility of an eternal world. He held that no creature, whether with motion or without, spiritual or material, could have been truly created and yet have had a beginning ;—creation, to the mind of the Seraphic Doctor, involving the idea of existence after non-existence, and therefore of commencement. This was St. Bonaventure's only difficulty ; he made nothing of the argument from the impossibility of an infinite series. If a creature could be eternal in any sense, or on any conditions, he would readily admit that it might be in motion from eternity.

“To suppose the world to be eternal, or to have been produced from eternity, on the previous supposition of the production of all things from nothing, is altogether contrary to truth. . . . But, to suppose the world to be eternal, on the previous supposition of the eternity of matter, seems reasonable and intelligible.”¹

A Materialist might put the argument somewhat in this way :—It is acknowledged that the universe must have had a beginning, if it were created or produced from nothing. But what if the creation remains to be proved ? What if matter never *came* into being, but was always there ? You may say that this involves the concept of an infinite series of changes, which is impossible ; but, then,

¹ “Ponere mundum aeternum esse, aeternaliter productum, ponendo res omnes ex nihilo productas, omnino est contra veritatem . . . Ponere autem mundum aeternum, praesupposita aeternitate materiae, rationabile videtur et intelligibile.” (In 2 D., 1, q. 2, concl.)

your own St. Bonaventure did not see the impossibility, any more than Aristotle or the Angelic Doctor.

After St. Bonaventure we naturally come to Scotus. In his *Commentary on the Sentences* he discusses very fully the question before us, answering the arguments on both sides, *more suo*, but apparently not inclining much to either side himself. In one paragraph, indeed, he seems to favour the contention that motion could not possibly be eternal ;—which is the very least we might expect, seeing that the contrary had been taught by St. Thomas:

The attitude of Scotus seems to have been copied by the Franciscan writers, down to the time of Suarez ; when, as has been said, even the disciples of the Angelic Doctor thought it well to modify their master's view. The question of the possibility of an infinite series was never one of the moot points between the two parties ; not because the Dominicans did not defend the teaching of St. Thomas, but because neither Scotus himself nor his disciples saw their way to defend the contrary,—at least very stoutly. Ocham, perhaps the ablest of them all, openly sided with the Angelic Doctor, carrying with him many of the Franciscans, besides many others who belonged to neither of the two great mendicant orders,—such as Gregory of Arimini, Aegidius, and Gabriel Biel.

Among the early Jesuits there was the same uncertainty ; if anything, they were in favour of the Thomistic doctrine. Vasquez, for instance, agrees with Soto that motion may have been in existence from eternity, though he will not allow it to have been always generating either substantial or accidental forms.

“I regard it,” he writes, “as much more probable that this whole universe may have been in existence from eternity, not only as to those substances and permanent things which

remain uncorrupted through an infinite duration, *but also as to motion*; but not as to generation both of substantial and of accidental forms."¹

So, too, the author of the *Philosophy of Coimbra* was of opinion that motion in a circle might have had no beginning.² Indeed, it may be affirmed that down to the time of Suarez, theologians and philosophers with few exceptions, held with St. Thomas that the inception of mechanical motion in the universe cannot be scientifically proved. In particular, they looked with the greatest suspicion on the argument from the impossibility of an infinite series. Even Suarez records his conviction that this argument is "slippery and uncertain."³ And, though on other grounds he drew with him most of his contemporaries and successors, yet there were not wanting, even among the Jesuits, those who continued to stand up for the old Thomistic tradition; among whom may be mentioned Arriaga,⁴ Oviedo,⁵ and Lynch.⁶

II.

Turning now to the intrinsic reasons that have been so often advanced by the moderns, to prove that mechanical motion must have had a beginning, I think it is usual to commence with those of the metaphysical

¹ "Ego existimo multo probabilius totum hoc universum potuisse esse ab aeterno, non solum quoad substantias et res permanentes sine corruptione per infinitam durationem, sed etiam quoad motum non autem quoad generationes tam formarum substantialium quam accidentalium." (*In iam.*, d. 177, c. 5.)

² *Phys.* L. 4, c. 2, q. 7, a. 4.

³ See the text at p. 445.

⁴ *Cursus Phil.*, *Phys.*, d. 17, n. 2.

⁵ *Cursus Phil.*, *Contr.* 19, punct. 1, n. 2.

⁶ *Phil.*, *Phys.*, L. 7, tr. 5, c. 2; Lynch was an Irishman, one of the Galway Lynches. He taught at Coimbra, and has left a Course of Philosophy in three vols. folio.

order, and which are based on the essential contingency of both matter and motion. The argument is put substantially in this way :—

The world and all that is in it, are but contingent beings ; and such beings must have had a beginning.

Now, it seems to me, that before arguing thus we should be sure that we understand what precisely is meant by “a contingent being.” Is the term used to designate a being that has to *come* or *be brought* into existence ; or rather, one whose essence does not necessarily imply the notion of existence ? The two definitions, though like, are very different : it seems to me that the second only is correct.

Contingency, in this connection, is opposed to necessity. Now, a necessary being is one which exists by reason of its essence ; that is, one which you cannot think of at all, unless you represent it to yourself as existing. In the essence of man there are two notes, animality and rationality ; unless we think of a rational animal, we do not think of a man. Existence is not of his essence ; hence, we may speak of a time before man was, and also of a time when he shall have ceased to be. Yet, what we think of and speak of is truly man,—of course in the possible not in the actual state. We cannot abstract thus from animality or rationality, and yet think of man. And so, if existence be supposed to be of the essence of a being, as it is in the case of God, we cannot think of such a being at all, unless we represent it as existing or having existence. On the contrary, if the being be supposed to be contingent, we may think of it as purely possible, and yet as essentially the same.

Few, I imagine, would deny, that in the sense of the foregoing explanation, the world is contingent. We do not break up the essential concept when we think of it

as merely possible.¹ But, does it appear that such a contingent being must have had a beginning? Why must it? What if it were always in possession of an existence which at any moment it might have lacked?

Here lies the weak point of the argument from contingency. The word, "contingent," does not bear the same meaning in the major and in the minor premiss; or, if it does, then one or other of the premisses is untrue. If to be contingent means to be under the necessity of beginning, how does it appear that the world is contingent? If, on the contrary, contingency is merely opposed to necessity, signifying a capacity to lose existence without change of essence,—then, how is it proved that contingent beings must have had a beginning?

They must, indeed, have had, all along the line of their existence, support from some being outside their own circle. And, of course, this being in turn would require to be sustained similarly by some other being; and so on *ad infinitum*. Nay, even though there were an infinity of contingent beings, the whole collection would require to be supported from without; otherwise,

¹ I am not forgetting the contention of Mr. H. Spencer (see p. 395), that "it is impossible to think of something becoming nothing, for the same reason that it is impossible to think of nothing becoming something,—the reason, namely, that nothing cannot become an object of consciousness." The argument in the text is not directed against those who may agree with Mr. Spencer; it is intended for Catholics and all others who admit that some things come out of nothing and return to the same state. Matter may not have actually done so, nor even mechanical motion; but what of time, location, figure, and such things? Ask an old man what has become of the elasticity and beauty of his youth. Mr. Spencer may answer that these, like motion, are not realities; common sense, however, asserts the contrary. It asserts, in addition, that they are really different from matter and motion; as is evident from this, that whilst matter and motion are always the same, the peculiar modifications of both, which lead to beauty, elasticity, and such things,—these, alas, too surely pass away.

in every instant they should pass into nothingness. This line of argument is perfectly valid. But, though it proves that the world must be constantly supported from without, it does not prove that it must have had a beginning in time.

III.

Here comes the question of the possibility of an infinite series of successive changes. And let me acknowledge, at once, that if mechanical motion had no beginning, there must have been such a series of changes in the past. The question, therefore, is altogether one of possibility.

Now, I have never been able to see how a series may not be infinite in any direction, unless it be supposed that in the same direction there is a limit ;—the existence of this limit being precisely what has to be proved.

Sometimes it is argued that it is impossible to add to infinity, whereas it is manifest that the series of changes in the world's history is being added to every moment. Is it true, then, that one cannot add to or increase an infinite series? It is plain that the series cannot be increased on the side at which it is infinite: but what about the other sides? If the universe has gone through an infinity of changes in the past, it is manifestly impossible to add to the number in that direction. You can find no term or limit there, to which you may add. Not so at the other side of the line,—in the present. There you have a limit; and to this limit you may add any number you please.

This may be illustrated from the future of human souls,—on the supposition of immortality. The first man and the last will live equally long in the direction of the future; they will not have lasted equally long in the direction of the past. The infinite series of the acts

of the soul of Adam, is greater far than those of your soul or of mine. All three series extend before the eye of God, actually existing throughout every link, infinite and equal in one direction, finite and unequal in another. It is quite plain that infinity can be increased at the side at which it is not infinite ; and it is only what is infinite in every direction, like possibilities, that cannot be increased at all. But, surely, the universe would not of necessity be infinite in every direction, if its motion should have gone through an infinite number of changes in the past.

This doctrine—of the possibility of an infinite series—is not new ; it was for a long time traditional among the disciples of St. Thomas. For instance, Capreolus writes :—

“ That an infinite thing should be exceeded or compassed on the side at which it is infinite, is repugnant ; not so, however, on the side at which it is finite. . . But, infinite time is finite in the direction of the future ; and, therefore, in that direction it is capable of increase.”¹

Nor is Capreolus alone responsible for this doctrine, which, as has been said, was for centuries the recognised teaching of the Thomists. It is admitted, as we have seen,² even by Durandus, who differed from his brethren as to the possibility of an eternity of motion. Suarez himself³ went so far as to say that he “ did not ascribe much force to the arguments which are wont to be drawn from the repugnance of an infinite series, since they are slippery and uncertain, and perhaps do not prove that such

¹ “ Infinitum, ex ea parte qua infinitum est, repugnat excedi vel esse acceptum, non autem ex illa parte qua finitum est. . . Infinitum autem tempus ex parte posteriori finitum est, et ideo ex hac parte fieri potest additio.” (*In Sent.*, L. 2, d. 1, q. 1.)

² See p. 426.

³ See the text at p. 445.

an infinity is impossible." Words such as these, from such recognised authorities, ought to be sufficient to make us very careful, how we place reliance on the arguments to which they refer; lest, "by bringing forward reasons which are not strictly conclusive," we should do exactly what St. Thomas, in this very connection, warns us not to do—"supply unbelievers with matter for derision."

IV.

Those who maintain that the motion of the universe must have had a beginning, usually return here to the argument from contingency. For, even though it could not be proved that an infinite series of successive forms is impossible, it can, they contend, be conclusively demonstrated that the collection as a whole, as well as the matter in which the forms are supported, must have been produced from nothing, and therefore begun to exist.

No collection is different in nature from the individuals of which it is composed. Make a heap of gold or silver as large as imagination can reach to, and it will all be gold or silver,—nothing else. Now, in this infinite series of forms, which for the moment we suppose to be possible, each link is contingent, not merely in the sense that it was possible for it not to have come into being at all, but in the further sense that it was actually at one time a pure possibility, which, accordingly, had to be brought into existence from nothingness. Such is the character of each of the forms taken separately; and such, consequently, must the whole collection be.

The fallacy in this argument seems to me to consist in transferring to the order of quantity what is true only of quality. The quality of a collection is measured

exactly by that of the individuals of which it is composed ; its quantity by their quantity, not by their quality in the least. The heap will be of gold or silver, according as its parts are of either metal ; how great it will be, depends not on the quality but on the quantity of the parts.

And so of any series, finite or infinite. Its quality will be the same exactly as that of the individuals, but the quantity will be the quantity of the series as a whole. If the number of members be finite, the quantity will be finite ; if infinite, the quantity will be infinite also.

Let me endeavour to illustrate this distinction by applying it to a series with regard to which we are all agreed. Take the future acts of an immortal being, such as a human soul. Each one of the series will have an end ; but will the series itself ever terminate ? Never. The whole collection will be like to the individuals in quality ; it will be contingent, as they are : but will the quantity be the same as theirs ? It will be the quantity of the sum of the series,—if an infinite number may be said to have a sum,—not of the individual links.

So, too, as regards the past. Each link in the chain of successive changes must have had a beginning : but is the same true of the series as a whole ? It depends on the length of the chain. If the number of links be finite, the series will have a termination,—a beginning or end, as the case may be. If the links be infinite in number, the series will have no termination,—whether by way of beginning or by way of end.

Indeed, the same applies to simultaneous collections, as may easily be seen in the case of possibilities. Every possible thing is but one ; and of possible creatures each individual is of finite dimensions. Does it, therefore, follow that the number or dimensions of all taken together are also limited ? The common and true opinion

is, that possibilities, taken collectively, are unlimited both in number and in extent.

It is denied, therefore, that a series must of necessity have a beginning, when taken as a whole, whenever the individuals of which it is composed have each to be brought out of nothingness. Though every act of the human intellect must of necessity come to an end, yet they constitute a series which is endless. Individual possibilities are limited, but the collection not so. Why not apply in the backward direction what is plainly true of the lateral and the forward? I do not feel convinced that a series of successions in the past must necessarily have had a beginning, merely because each individual member of the series must at some time have begun to exist.

If, indeed, the argument took a different shape, as it often does ;—if it were contended that, as every one of the infinite series of causes in the past, was, at best, but a contingent being, so the whole series must be regarded as contingent, and, as such, incapable of keeping itself in existence for a second instant, apart from the conserving influence of some wealthier cause;—if one were to argue thus, the contention would be admitted by all who profess a scientific conviction of the necessity of immediate divine conservation of all things. This is how I understand the argument for the existence of a Prime Mover, as it is put by Aristotle and St. Thomas. Whether it suffices to carry conviction on the supposition of the truth of the dynamic theory, is another question. I have already¹ shown that there is one reality, at least,—the “force” of the creature and its exertion,—which does not stand in need of immediate divine conservation, in accordance with dynamic

¹ See pp. 99, &c.

principles. Yet, "force" and its exertion are manifestly contingent beings. And if one such reality may be produced altogether by another, why may not the same hold of the members of an infinite series? Thus, once more, we find that the dynamic theory helps the Atheist to withstand the arguments from reason for the existence of God.

v.

We may now proceed to examine the question from the point of view of Astronomy and the physical sciences. To begin with, it is admitted by all that the energy of the sun is being constantly dissipated in the form of heat. This fact is sometimes illustrated by the analogy of a burning coal or a lighted candle ; a better illustration may be taken from the cooling of heated metal. In the case of the coal or the candle, the substance of the body is dissipated as well as its motion ; whereas the sun's substance remains undiminished, except in so far as he may throw off a planet at far-distant intervals of time.

At all events, it is admitted that the energy of the sun is being constantly dissipated. The store is large, but not infinite ; consequently, it neither will last nor can have lasted an infinity of time. It must, therefore, have had a beginning, at least in its present form as energy of the sun.

It has been suggested that certain bodies, similar to those which are known to be moving through space at present, may have been attracted occasionally to the solar mass ; and that the force of these collisions may have supplied at intervals in the past, new stores of heat and other forms of energy. No doubt this has happened occasionally ; but even that source of supply must have been limited in extent. For, after every collision of this

kind the central mass is increased not only in energy but in substance ; so that, if the process had been going on from eternity, the mass of the sun should now be infinitely large.

The same applies with equal truth to the collision of star with star, or system of stars with system. They are all constantly dissipating their energies through the ether medium ; they are all equally subject to friction and gravitation ; and the fact that they have not yet united into one continuous mass, is proof that the process of dissipation has not been carried to a sufficient length,—in other words, that it has not been going on for ever.

Professors Stewart and Tait put the argument as follows :—

“ The very fact that the large masses of the visible universe are of a finite size, is sufficient to assure us that the process cannot have been going on for ever ; or, in other words, that the visible universe had its origin in time ; and we may conclude that if the visible universe be finite in mass, the process will ultimately come to an end.”¹

Mr. Herbert Spencer admits the difficulty, and attempts to meet it in the following manner :—

“ If stars concentrating to a common centre of gravity eventually reach it, then the quantities of motion they have acquired must suffice to carry them away again to those remote regions from whence they started. And since, by the conditions of the case, they cannot return to those remote regions in the shape of concrete masses, they must return in the shape of diffused masses. Action and reaction being equal and opposite, the momentum producing dispersion, must be as great as the momentum acquired by aggregation ; and being spread over the same quantity of matter, must cause an equivalent distribution through space, whatever be the form of the matter.”²

¹ *The Unseen Universe*, art. 163.

² *First Principles*, 5th ed., p. 534.

Readers who may not be familiar with writings of this kind, may desire to have Mr. Spencer's meaning in what to them will be plainer words. He means that the energy developed by the collision of two or more stars, would be sufficient to diffuse their substance into a state of nebulous tenuity. Moreover, after the collision there should be a rebound, as when an india-rubber ball falls on a pavement ; or, possibly the nebulous masses might penetrate one another, passing out beyond as much as they had travelled before colliding—as a pendulum swings equally in both directions. In either case, the masses of nebulous matter would be as much diffused after the collision as it was before. “The quantities of motion they have acquired must suffice to carry them away again to those remote regions whence they started. . . . Action and re-action being equal and opposite, the momentum producing dispersion, must be as great as the momentum acquired by aggregation ; and being spread over the same quantity of matter, must cause an equivalent distribution through space.”

This might do, if it were not for the ether medium, which causes friction, and thereby drains energy constantly from the colliding and diffusing masses. A pendulum would go on swinging for ever, if there were no atmosphere to resist it and drain it of its motion. And, just as surely as friction with the atmosphere stops the swing of a pendulum, unless there be a constant supply of energy to make up the loss ; so surely must the ether resist the backward and forward motions of these colliding masses, bringing them ultimately to a state of rest. The quantity of motion they had before collision, will “suffice to carry them away again,” almost, but not quite, “to those remote regions whence they started,” “The momentum producing dispersion” must be almost, not quite “as great as the momentum acquired by aggre-

gation ;" and "being spread over the same quantity of matter," and through the ether also, must result in not quite an "equivalent distribution through space."¹ During all this time, moreover, the same ethereal medium is constantly draining the colliding and dispersing masses of their radiant heat.

For this difficulty also Mr. Spencer is prepared :—

"One condition, however, essential to the literal fulfilment of this result, must be specified; namely, that the quantity of molecular motion radiated into space by each star in the course of its formation from diffused matter, shall either not escape from our Sidereal System, or shall be compensated by an equal quantity of molecular motion radiated from other parts of space into our Sidereal System. In other words, if we set out with that amount of molecular motion implied by the existence of the matter of our Sidereal System in a nebulous form; then it follows from the persistence of force, that if this matter undergoes the re-distribution constituting Evolution, the quantity of molecular motion given out during the integration of each mass, plus the quantity of molecular motion given out during the integration of all the masses, must suffice again to reduce it to the same nebulous form."²

One cannot undertake to translate this into the language which most of my readers will readily understand, without fear of doing injustice to Mr. Spencer by misrepresenting his meaning. As I understand him, his contention is, that the drain of energy just referred to may be compensated by the return of an equal amount of energy in another form: Energy passes off in the shape of friction and heat; it may return,—how? By "radiation from other parts of space into our Sidereal System."

Now, of course, there would be no difficulty if the energy that passes from the colliding masses into the

¹ See note at p. 447.

² *Ibid.*, p. 535.

ether, were to return at some time in equal measure from the ether into the masses. To use Mr. Spencer's terminology, "the quantity of molecular motion given out during the integration of each mass, plus the quantity of molecular motion given out during the integration of all the masses, must again suffice to reduce it [the whole mass of matter] to the same nebulous form." That is, if the entire sum of molecular motions given out were radiated back again, the original condition of the masses would be reproduced. Yes, *if* the entire sum were returned. But is it? What an "if" this is!

Here, then, is the heart of the question we are now considering. Mr. Spencer thinks it not impossible that—

"On the hypothesis of an unlimited space, containing, at certain intervals, Sidereal Systems like our own, it may be that the quantity of molecular motion radiated into the region occupied by our Sidereal System, is equal to that which our Sidereal System radiates; in which case the quantity of motion possessed by it, remaining undiminished, it may continue during unlimited time its alternate concentrations and diffusions."

Is it, then, or is it not, a fact, that our Sidereal System is receiving from other radiant bodies as much energy as it is dissipating by radiation on its own part? This is a question of fact for physicists to deal with. Is it not a fact, gross and palpable, that the earth, at least, has cooled? Is it not almost equally certain that the sun is dissipating more energy than it receives? Could these things happen if "the quantity of molecular motion radiated into the region occupied by our Sidereal System, were equal to that which our Sidereal System radiates"?

Suppose one or more iron balls to be raised to a white

¹ *Ibid.*

heat, and then exposed to the action of some agent powerful enough to compensate exactly for the radiation of the metal, the heat which each of the balls had at first, would never be diminished, as long as the condition of exposure remained the same. Does not the principle apply equally to the members of every system,—the solar as well as those which may be subjected to experiment in a laboratory?¹

If, indeed, while a mass of heated matter is radiating equally in all directions, compensation were made at but one side, and there only to the same amount as is being radiated in that direction, it is plain that a cooling must ensue in the other parts of the system, and must soon extend even to the surface where the compensation is being received.

But it is equally plain that in this case the process of integration and dispersion should soon terminate; unless, indeed, the energy radiated in all directions were to be afterwards returned somehow; and what is to make it return afterwards more than at first?

We are thus brought back to our previous position,—that the fact of the large masses of the visible universe being of finite size, together with the constant waste of energy to which they are subject, points to the conclusion that the process of which we are witnesses cannot have been going on from eternity.

VI.

Are we, then to take it as demonstrated by modern physical science that the mechanical motion of the

¹ "To restore to the sun every instant its losses by radiation, the whole celestial vault would have to radiate as powerfully as the sun does,—in which case the earth and planets would very soon acquire (at their surfaces) the sun's temperature." (*The Unseen Universe*, art. 162.) It does not take much knowledge of physical science to feel satisfied that the atmosphere in which we dwell is not as hot as that of the sun.

universe had a beginning? The argument just concluded points in that direction ; but there are reasons, not mentioned by Mr. Spencer, which point the other way.

1. In the first place, the argument from the dissipation of energy applies only to certain forms of mechanical motion,—the molar and molecular movements of what are called the heavenly bodies. It does not in the least refer to the vibrations of the medium in which these bodies move. The widest conclusion, therefore, that can be drawn from the argument is, that some portion or some form of the mechanical motion of the world had a beginning, leaving it still an open question, as far as science is concerned, whether the ether and any similar media there may be, were vibrating from all eternity.

It would, of course, be of the greatest importance, as a proof of the existence of a Prime Mover distinct from matter, if we could assert on the authority of physical science, that even a portion or form of the mechanical motion of the universe came into existence in time. It is almost as great a proof of supernatural power to restore life to one dead man as to fifty. And, as the production of the least of these new motions or forms of motion must have been quite beyond the capacity of any energies that might have existed antecedently (else, why should not the new forms have been produced in the infinite past?); it follows that some external agent should have interfered at the time of production. And thus Astronomy and Physics would combine with Geology and Biology in testifying to the existence of the Creator of the world.

2. Looking at the question, however, with an eye to truth and not merely to advantage, I am compelled to record my conviction that the argument from the dis-

sipation of energy does not seem to be absolutely conclusive. It does not exclude every conceivable hypothesis to the contrary. For, even though it were acknowledged that the sidereal processes cannot have been going on for ever in their present form, it might still be argued that, in their substance, they may not have begun *de novo* when the present form first appeared. This form might have resulted from the collision of two or more sidereal systems, which, instead of alternating during infinite time between concentration and diffusion, according to the idea of Mr. Spencer, may be supposed to have never met before, but to have been drawn together from infinite distances in space, throughout an eternal past. If this hypothesis is possible, it is plainly not excluded by any argument that may be drawn from the dissipation of energy.

As to the question of possibility, it depends on the further question, whether infinite distance in either space or time may be regarded as not excluded by the truths of Metaphysics. On this question I have already said all I have got to say. I cannot see that an infinity of time past is a whit more impossible, provided it have no beginning, than an infinity of future time that shall have no end. Nor can I find any conclusive reason for believing that an infinity which is possible in the order of succession in time, is not equally possible in the order of extension in space. Let me put on record here an extract from Suarez, to which I have alluded more than once, and which I heartily endorse:—

“I do not ascribe much force to arguments of this kind, which in connection with this point, are wont to be drawn from the repugnance of an infinite series; since they are slippery and uncertain. And this, at least, I regard as most true,—that an infinite number is no more repugnant in things

permanent than in things successive ; this is proved from reason, and is admitted by St. Thomas."¹

You may ask me how these travelling masses first came or were brought into existence. My answer is, that they never "came" and were never "brought." "Coming" and "bringing" implies that what comes or is brought into a place was not there already. But the supposition with which we are now dealing is, that the masses in question were always in existence ; conserved, indeed, or continuously created by the Prime Mover and Producer, but not created in the sense of being brought out of pure possibility.

The reader must not understand me to convey, that the hypothesis of masses travelling thus from infinite distances in time and space, is anything more than a bare possibility. It seems to me to be possible,—barely possible ; nothing more. Whoever, therefore, refuses to acknowledge and serve the Creator, must be content to stake his fate on this possibility ;—a course the prudence of which might, surely, be open to question, even though there were no other evidence of the Creator's existence.

¹ "In hujusmodi argumentis quae in hoc puncto ex alio de repugnantia infiniti sumi solent, non magnam vim facio, quia sunt lubrica et incerta, et fortasse non probant omne infinitum esse impossibile ; et hoc saltem verissimum existimo, in numero rerum permanentium non magis repugnare esse infinitum simul quam successive ; id enim convincit ratio et fatetur D. Thomas. *De Op. Sex Dierum*, L. 1, c. 2, n. 10. Cf. *Metaph.*, d. 29, s. 1, n. 26. Suarez wrote the work *De Opere Sex Dierum* after the *Metaphysics*. The text of St. Thomas referred to, is *Cont. Gent.*, l. 2, c. 38. I have already quoted from the *Opuscula* a more definite and categorical statement (see p. 423). It is but fair to say that, according to many of his interpreters, the Angelic Doctor, in the *Summa* (1, q. 7, a. 4), retracts this earlier opinion. I cannot see that the retraction extends to the case of a multitude such as I contemplate,—which might be capable of increase in more than one direction, but not in all, and is not infinite *adequate* but only on certain lines.

NOTE TO CHAPTER XVIII.

ON THE ORIGINAL FORMS OF MECHANICAL MOTION.

The inspired narrative of the formation of the universe commences at the period when the earth was already rounded into a separate planet. "In the beginning God created heaven and earth; and the earth was void and empty." How it came to possess this separate existence,—whether by one instantaneous act of creation, or by gradual evolution from a pre-existing nebula,—we are not told. The anterior history of the earth and of the heavenly bodies has to be learned from physical science; and theologians and metaphysicians should be prepared to accept the conclusions of the scientists on this matter, submitting to them with respect proportionate to the evidence on which their conclusions are based.

Accordingly, it is for physicists to say what form or forms mechanical motion had at the time of its first appearance in the visible universe. I have already (Chap. XI. 4) referred to the reasons which make it seem at least more probable, in the present state of physical science, that the vibrations in which gravitation consists, and which result in the visible movements of the heavenly bodies, preceded and produced heat, adhesion, cohesion, chemical affinity, light, and even magnetic and electric currents. Gravitation would thus have a claim to be considered the most primary form of the energy of matter.

It is plain, however, that vibrations in a medium like the ether could never lead to gravitation unless the waves were to beat on masses different in texture from the substance of the vibrating medium. Gravitation, therefore, cannot have begun as formal gravitation,—that is, as a force which is actually engaged in pressing masses together,—until there had been formed at least atoms of a texture different from the ether medium whose vibrations were to press them in.

How, then, were these elementary atoms produced? It should be borne in mind here that few physicists of name, however they may support the atomic theory as a working hypothesis for the present, really believe that the seventy elements, more or less, now known to chemistry, were all in existence from the beginning of the material universe. As

there was gradual development of organisms from the simplest to the most complex forms, so, it is thought, there was a gradual development not only of what we now call chemical compounds, but of the simplest elements,—of which, indeed, almost all are absent from some of the less developed nebulae known to astronomers.

If there is any truth in the vortex theory, it would incline us to suspect that the most elementary form in which matter was subject to gravitation, was that of vortex rings, which must have been produced, not by vibrations, but by circular or spiral motions. This supposes three things at least to have been in existence from the beginning,—(1) an almost absolutely continuous medium capable of being moved and sustaining two forms of motion,—(2) vibrations, and (3) vortices. And possibly these three were the elements in their simplest form from which the present complex and orderly universe was developed. But, as has been already observed, it is for the physical scientist, not for the metaphysician or theologian to speculate on matters of this kind.

There is one thing, however, which theologians must carefully bear in mind. If the origin of our solar system is to be explained in accordance with the nebular hypothesis, there must have been light long before the outermost of the planets was separated from the sun; and therefore long before the period at which the narrative in Genesis opens with the earth rounded into its present shape. Accordingly, when it is said that light began on the first “day,” the meaning is, that whereas up to that period the crust of the earth at which we dwell was in complete darkness, owing to the outer atmosphere being one dense mass of vapour; the vapour began on the first “day” to condense and fall to the crust beneath, leaving a thinner canopy of cloud overhead, which light could penetrate, though not in sufficient quantity to make visible the bodies from which it came. When, later on, the sun, moon, and stars are said to have been made on the fourth “day,” the meaning likewise is, that at this period the cloud canopy was rent, showing the clear sky, at first in tiny patches, which grew ever broader, and through which the sources of light became visible from that portion of the earth where we reside.

Thus, light as well as the other forms of motion was in existence from a very early period in the history of the universe, though, like most of them, not from the very beginning. It was, moreover, radiated by the stars and the sun, and reflected by the outer planets, long before the earth had acquired a separate existence. In addition, these bodies were all visible from the earth's outer surface ; but for a long time they were not visible from those inner regions where the crust was formed, and where men and animals spend their lives.

INDEX.

	Page		Page
Action and <i>passio</i> not really different - - -	25, 58	Attraction disappearing from science - - -	147
— a form in flux - - -	156	Attraction, generally - - -	248, &c.
— defined as motion by St. Thomas - - -	290	— teaching of the ancients on - - -	267
— at a distance, 134, 186, 190, 191		Augustine, St., on the evolution of species - - -	406
— immanent and transient - - -	188, 205	Barker, Prof., on energy of position - - -	147
— subject of transient - - -	204	Beatific vision, Gotti on the immediate principle of - - -	117
— does not necessarily require reaction - - -	224	Being and God, not most universal in the same sense - - -	414
Activity, two kinds of - - -	10	Billuart, refutes a charge of Calvinism - - -	84, 86
— in what sense it belongs to an agent - - -	67	Bonaventure, St., admits the possibility of an infinite series - - -	428
— immediate principle of - - -	278	Cajetan, on the production of substantial forms - - -	324
Actual grace, its nature - - -	53	— commendation of by Leo XIII. - - -	44
— supposes a quality - - -	54	— on the teaching of the Thomists with regard to an eternal world - - -	425
<i>Actus primus et secundus</i> , - 10, 12, 32		Calvin, on free-will - - -	82, 88, 92
Adhesion, its nature - - -	261	Calvinism, charge of refuted by Billuart - - -	84, 86
Affinity, chemical, its nature - - -	137, 224, 262, 265	Capillary attraction, nature of - - -	262
Alteration, dependent on local motion - - -	2, 26, 52	Capreolus on the possibility of adding to infinity - - -	434
Ancient philosophers, errors of in Physics - - -	18, 276	Causality: see "partial," "permission"	
Angel, moves the prophet - - -	245	Cause, four kinds of - - -	131, 153
Aristotle, on motion and activity - 16-41		— material, nature of - - -	129, 131
— his use of <i>ἐνέργεια</i> and <i>δύναμις</i> , - - -	27-32	— efficient, definition of - - -	153
— on kinetic energy - - -	24, 35	— how distinguished from material, formal, and final - - -	154
— on the ether - - -	49	— moral - - -	168, 172-5
— definition of motion - - -	24	— physical - - -	172
— on the conservation of motion - - -	35	Character, sacramental, nature and efficacy of - - -	63, 103
— on the subject of transient actions - - -	204	Chemical affinity, nature of - - -	137
— on the nature of resistance - - -	223, 232	Cohesion, its nature - - -	261, 265
— on attraction - - -	271, 273	Common sense, necessity of in students of philosophy - - -	398
— on the principle of improductibility - - -	394	Concurrence of God with the actions of creatures, four kinds of - - -	48
— taught that matter and motion had no beginning - - -	421	— in what sense it is immediate - - -	64
— believed in one God - - -	421	— is it simultaneous? - - -	112
— argues from the contingency of matter - - -	437		
Astronomy, does it prove that the motion of the universe began? - - -	438		
Atomic Theory - - -	136, 138, 149, 201		
Attraction due to impulsion - - -	137, 144		

	Page		Page
Concurrence, proof of	95, 344	Dynamic Theory, does not explain	
the proof invalid		other forms of attraction	267
according to the dynamic		does not explain	
theory	345	the production of substantial	
is it indifferent?	378, &c.	forms	300, &c.
Conditions, their nature	177	nor of vital	
Conservation of motion, Aristotle		actions	343
on the	35	if true, would	
St. Thomas on the	38-41	do away with the necessity of	
Conservation, immediate, of all		a Prime Mover	122, ch. xvii
things, proof of	100	does not explain	
Conservation of energy and of		free-will	370, &c.
matter, principles of	387, &c.	weakens the	
Conservation of matter and		proofs of the existence of God	
motion, a proof of the existence		386, &c., 400, &c.	
of God	417	<i>Δύναμις</i> , meaning of, in Aristotle	27-32
Contingent being, meaning of	431	Duraudus, doctrine of mediate	
invalid argument		divine co-operation	100
from	432	on the possibility of an	
valid argument from	437	infinite number	426
Continuity, want of absolute, a		Duration in time, how produced	193
condition of vibration	213	Eduction from potentiality	300
Co-operation: see 'concurrence'		Effect, the term of an action	
of God with creatures,		102, 155-6	
necessity of	95, 100	may be an action	156
divine, doctrine of,		differs from result	285
a particular application of a		Efficient causality, essence of	13, 153
general principle	98, 101	Electricity, a mode of motion	
a proof of the existence		144, 145	
of God	417	<i>Ενέργεια</i> , meaning of, in Aristotle	
Creation, technical meaning of	317	28-32	
an incommunicable		Energy of position	136-7
act of God	409	Energy, kinetic, nature of	142-3
this could not be held		potential, nature of	144-7
on dynamic principles	410-6	really kinetic	144-7
in some sense covers		most elementary form	
an infinite distance	410	of	264, 447
in what sense most		Ether, Aristotle and St. Thomas	
universal	413	on	49, 273
Croll, Prof., on potential energy	148	the store-house of all	
Dalton, on the atomic theory	136	energy	147, 296, 448
Descartes, the founder of Modern		origin of the term	273
Philosophy	124	density of	273
his two main principles		not dissipating its	
of Physics	124	motion	444
on the conservation of		receiving motion from	
motion	125-26	the sun	438, 444
Details, may be insisted on too		Eucharist B., species of	235, &c.
much	359	Body of Christ in, not	
Disposition, its nature	177	capable of resistance	240
Dummermuth, Fr., O.P., on		Evolution, a fact of nature, 401, 406-8	
immediateness of virtue	71-73	ordinary argument	
on simultaneous		against	402
concurrence	114	this argument not	
Dynamic Theory, statement of	4-8	valid on dynamic principles	402
word "dynamic"		of mechanical motion	447
mic	14	Extension, in relation to death	
cannot explain		and resurrection	40
gravitation	248, &c.	to specific difference	315

	Page		Page
Extension, in relation to evolu- tion of species - - - - -	400, &c.	Free-will, inception of 391, 396-9,	471
— in the Eucharistic		Ganot, on the kinetic theory	143, 145
— species - - - - -	235	Gases, kinetic theory of	137, 145
— the basis of all the		Gassendi, on the activity of	
— other accidents - - - - -	237	— matter - - - - -	132
— the only absolute		Generation, not necessarily of	
— accident - - - - -	238	— like by like - - - - -	402
Faculty, really different from		— spontaneous, possi-	
— substance - - - - -	278	— bility of - - - - -	406
Ferrariensis on the two forms		— actuality of, according	
— of virtue - - - - -	43	— to Huxley, St. Thomas, and	
— commendation of,		— St. Augustine - - - - -	486-8
— by Leo XIII. - - - - -	44	God, His operation in creatures	48, 64
— on immediateness		— See "concurrence,"	
— of virtue and of supposit	70	— "co-operation."	
Flow, not necessarily motion	289	— His existence difficult	
Foetus, human, evolution of,		— to prove on dynamic princi-	
— according to St. Thomas - -	403	— ples - - - - -	386, &c.
— and to Haeckel - - - - -	404	— proved on kinetic prin-	
Force, current motion of - - -	4, 21	— ciples - - - - -	416-8
Force, admitted - - - - -	16	— proved by the resisting	
— no dissertation on the		— power of matter - - - - -	419
— nature of - - - - -	19	God and being, not universal in	
— Stewart and Tait on - - -	4	— the same sense - - - - -	414
Force, latent - - - - -	136	Gotti, on the immediate principle	
— and energy - - - - -	136, 139	— of the beatific vision - - -	117
Form in flux, an action - - -	156	Goudin, on action and motion	
Forms, accidental, how produced			333, &c.
— 278, &c.; 292, &c.		Grace, actual, supposes a tran-	
Forms, substantial, existence of	299	— sient quality - - - - -	54
— production of - - - - -	299 &c.;	— nature of - - - - -	53, 104, 106
— according to the dynamic		— proof of the necessity of	103
— theory - - - - -	300	— necessary even with super-	
— education from potenti-		— natural virtues - - - - -	122
— ality - - - - -	300	— how produced by the	
— how produced, according		— Sacraments - - - - -	321, 326
— to the Thomists - - - - -	302, &c.	Grafting, effect on unity - - -	198
— not always produced by		Gravitation, nature of 137, 144,	146
— like forms - - - - -	305, &c.	— not explained by dy-	
— how produced, true		— namic theory - - - - -	248, &c.
— opinion - - - - -	312, &c.	— Le Sage's theory of - - -	254
— not created, except the		— undulatory theory of - - -	255
— human soul - - - - -	317	— vortex theory of - - - - -	256
— cannot be produced by		— differs from other	
— matter alone - - - - -	389	— activities - - - - -	257
Franciscans on the possibility of		— does it take time to	
— an eternal world - - - - -	427-8	— travel? - - - - -	259
Free-will, proof of outlined -	365-6	— differs from heat and	
— nature of, 367 &c.; 378 &c.		— electricity - - - - -	263
— is it a power of initia-		Harper, Fr., S.J. on grafts - -	199
— tive? - - - - -	367 &c.; 378 &c.	— on the inca-	
— can it actually abstain	375	— pacity of lower forms to gene-	
— in what sense actually		— rate higher - - - - -	301
— indifferent? - - - - -	378-81	— on the intro-	
— correct notion of - - - - -	380-81	— duction of substantial forms	
— traditional definition		— 308, &c.	
— of - - - - -	381	— on evolution - - - - -	402-5
— Mill's objection to.		Haeckel, on the development of	
— refuted - - - - -	383	— the human foetus - - - - -	440

	Page		Page
Heavenly bodies, their influence on the production of motion	272-3	Lehmkuhl, on occasions of sin	158, &c.
----- of substantial forms	304, 313, &c.	Leibnitz, on the activity of matter	133
Huxley, Prof., on spontaneous generation of living forms	406	----- on transient actions	188
Idea, formation of, in what sense a motion	52, 297	Leo XIII. on Cajetan and Ferrariensis	44
Immanence of vital actions	350 &c.	Lessius, on occasions of sin	161
----- denied by Saurez	350	Liberatore, proof of immediate divine co-operation	95
----- objection to this view	363	----- incorrect definition of free-will	368-9
Immanent actions, how they can exist in organs, difficulty	360, &c.	----- his inconsistency	369-72
----- explanation suggested	361-3	Life, inception of	391, 396-9, 417
Immediateness of supposit and of virtue	73, 114	----- first origin of, how effected	405
Impenetrability: see "Resistance"		----- according to Huxley	406
Imponderables	135, 151	----- as described in <i>Genesis</i>	407
Individuality in matter, depends on extension	40	----- St. Thomas	407
Individuality may be partly lost	37, 197	Light, a mode of motion, according to St. Thomas	56
Induction, requisites for,	358-9	----- when it began	448
----- office of prudence with regard to	359	Living organisms, how they differ from machines	353
Infallibility always due to necessity	376	Local motion, the basis of all activity	296
Infinite series, possibility of	423-30	Lodge, Prof. on the density of the ether	275
----- admitted by early Thomists	425-6	Luther, on free-will	82-88, 92
----- by St. Bonaventure	428	Magnetic attraction, nature of	263, 265
----- by Ockham	429	Magnetism, a mode of motion	144
----- by the early Jesuits	429	Malebranche, Occasionalism of	179
----- must it have a beginning?	435	Materialists admit efficient causality	192, 193
Infinity, is it capable of increase?	434	Matter, unable to produce anything <i>de novo</i>	387
----- opinion of Capreolus	434	----- its improductability and imperishability	387
----- and of Durandus	426	----- conservation of, a proof of the existence of God	417
Infinity, of possibilities	436	Maxwell, Clerk, on magnetism, electricity, and the luminiferous medium	265
----- simultaneous	436	----- statement of the principle of conservation of energy	388
Influence, <i>in-fluxus</i> in physical causality	13	Mazzella, Card. explains the doctrine of the early Thomists as to the immediate principle of supernatural acts	119
Instrumental causality, St. Thomas's theory of	46	----- holds that free actions are necessary in the beginning	373
Intention, its meaning	57	----- and that free-will is a power of abstaining from action	373
Intention, actual and virtual	170	----- teaches that action begins as a <i>passio</i>	374
Jesuits, early, admitted the possibility of an infinite series	429	Mechanical theory, identified with the kinetic	14
Kelvin, Lord, on the kinetic theory	145-7	Merit, nature of	178
-----, on gravitation, cohesion, and chemical affinity	265		
Kinetic theory, statement of	8-14, 15, 36, 178		
----- word "kinetic,"	14		
Kinetic energy in Aristotle	24, 35		
Kinetic theory of gases	137, 145		

	Page		Page
Metaphysical order, meaning of	169	Nothing, is it unthinkable ?	395
Meyer, Livinus de, charge of Calvinism made by	83	Obediential powers are passive in the first instant	120
Mill, argument against free-will	382-4	Occasion, its meaning in moral theology	158, &c.
Mivart, Dr., on the kinetic tendency of modern science	139	—— its nature explained	166, 176
—— on the nature of force	142	Occasionalism, charge of	66
—— on Stallo's <i>Concepts of Physics</i>	146	—— nature of	179
—— on the transit of motion	184, 191	Ocham, admits the possibility of an infinite series	429
Moderns, vagueness and shallowness of	419	Order, physical, metaphysical, and moral	169
Molina, on prevenient grace	113	Partial causality, denounced by Thomists	108
Molinists, incorrect notion of free-will	368	—— admitted by moderns	108-116
—— inconsistent with the divine co-operation	372	Pendulum, does its motion ever cease ?	393, 395
Motion, nature and three kinds of	2	Permission, and causality	161-6
—— found in every mass of matter	2	Pesch, Fr., S.J., on the passive causality of the moderns	127
—— in what sense it may be said to commence	2	—— on the passage of accidents	184, 185, 190
—— Aristotle's definition of	24	—— on resistance	219
—— term used by analogy of intellect and will	52, 57	—— on the eduction of forms from the potentiality of matter	300
—— molar and molecular	140	—— on the generation of substantial forms	318
—— how it passes	191, &c.	—— on vital activity	338
—— in space, how effected	193	Phlogiston	135, 151
—— differs from flow	289	Physical order, meaning of	169
—— local, requisite for change of every kind	296	Possibilities, infinite in number	436
—— three kinds of	335	Potentiality, first and second	32
—— not a reality according to H. Spencer	393	Power, nature and species of	4
—— of spirits, how explained	296-8	<i>Praemotio physica divina</i>	12
—— mechanical, conservation of, a proof of the existence of God	417	—— how previous ?	12
—— its origin	Ch. 18	—— necessity of	56
—— had a beginning, according to revelation	420	—— admitted by Molinists	113-4
—— evidence of natural science, disputed	421	—— characteristic of Thomistic Philosophy	342
—— modern Catholic writers of opinion that science proves its inception	421	—— not excluded by spontaneity	342
—— not so the ancients	421	Production, proof that it actually occurred	389, &c.
—— its inception cannot be scientifically proved	444	Prudence, nature of	359, 398
—— its original forms	447	—— office of	359
Moral order, meaning of	169	Pusillanimity, danger of	358-9, 398
Natural, its meaning	174	Qualities, real but not absolute accidents	238
Newton, on the activity of matter	133	Quantity, the principle of individuation in matter	40
—— on action at a distance	134, 253	—— the only absolute accident	238
—— on gravitation	134, 253	Reaction not necessary <i>ex natura rei</i>	224
—— on the nature of light	135	Resistance, required for transmission of motion	212

	Page		Page
Resistance, not due to action	220, &c.	Species in the Eucharist	235, &c.
— due to moral causality	229	Spencer, H., on potential energy	147
— might be given to		— on the indestructibility	
— pure space	246	of matter	387
— in relation to vital		— and of motion	391-3
actions	363	— on the unthinkableness	
— not explained by the		of "nothing"	392
moderns	418	— Metaphysics, his extra-	
— existence of, a proof		ordinary	393-5
of the existence of God	419	— on inproductibility	432
Result differs from effect	285	— on an infinite series of	
Resultance, its term not an effect	102	integrations and disintegra-	
— nature of	283, &c.	tions of matter	439, &c.
Resurrection, identity of the		Spirits, action of matter on	243
body in the	37, 40	— how moved locally	296-8
Ripalda, on the early Thomists	117	Spontaneity, what it means	341
Sacraments, mode of causality		— does not exclude	
of	61, 62	divine premotion	341-6
Sacraments, how they produce		Stallo, on the nature of potential	
grace	321, 326	energy	146, 148
Sage Le, theory of gravitation	425	— his <i>Concepts of Physics</i> ,	
Sanctification, an incommuni-		Mivart on	146
cable act of God	63, 77	Stars moving from infinite dis-	
Sanseverino, on the passage of		tances	445
accidents	183, 188, 189	Stewart and Tait, error of in	
Scandal, direct and indirect	159	regard to the objectivity of	
Scotists: see "Franciscans."		force,	5
Scotus, on an infinite series	429	— on potential	
<i>Seminales rationes</i> , meaning of	400	energy	146
— still in matter	408	— see "Tait,"	
Semi-Pelagianism, Molinists		"Unseen Universe"	
charged with	106	Suarez, on the obidental	
Sensation, inception of	391, 396-9, 417	powers of creatures	118
Simultaneous, partial co-opera-		— on the nature of resis-	
tion of God and the creature,		tance	227
denied by St. Thomas	76	— on resistance in pure	
— admitted by Card.		space	227
Zigliara	113	— <i>resumé</i> of the teaching	
— danger of	343	of the ancients on attraction	267
Solar system, constantly dis-		— on attraction	270
sipating its mechanical motion	439	— on the immediate prin-	
— may the motion		ciple of activity	280-3
be restored?	439	— on the incapacity of lower	
Soto, admits an eternity of		forms to generate higher	301
motions as possible	426	— on the production of sub-	
Souls, human, might possibly be		stantial forms	303, &c.
communicated	412	— on action and motion	328, &c.
Space, pure, capable of resis-		— not claimed as an ad-	
tance	246	vocate of kinetic theory	332
— and resists actually	246	— denies the immanence of	
Species, proof of difference of	357	vital actions	350
— production of, a proof		— objection to this view	363
of God's existence	386, &c.	— incorrect explanation of	
— difference of, knowable	396	free-will	368
— objection	400	— effect of his writings on	
Species, actually produced <i>de</i>		the schools	430
<i>novo</i>	400	— on infinite number	434, 445
— even in living things		Supernatural acts are so in sub-	
—	401, 406-8	stance	121
		Supposit, nature of	10

	Page		Page
Supposit, immediateness of	14, 69, 74,	Thomists, change of view regard- ing the possibility of an eternal world	427
Tait, Prof. P. G., on various forms of energy	265	Time not required for motion in an absolutely continuous mass	214
—see "Stewart," "Unseen Universe"		— otherwise required of necessity	258
Thomas, St., on the conservation of motion	38-41	Transient action	188
— on two kinds of power	42, 75	Transient motion	13
— on the functions of ether	49	Transmutation, nature of	283, &c
— on the nature of actual grace	53	— and causality	289
— says light is a mode of motion	56	Transubstantiation, is it action?	336
— denies simultaneous divine concurrence	76	Trent, Council of, on causality	81-93
— on the transmission of motions	187, 188, 202	— true meaning of	90
— on the subject of transient actions	204	Unity, the result of contact	196, &c.
— on the nature of resistance	223, 231	"Unseen Universe," on the be- ginning of mechanical motion	439
— on the interaction of spirit and matter	243	— on the amount of heat necessary to counter- balance the waste of the sun's energy	443
— on attraction	272, 273	—see also "Tait" and "Stewart."	
— on resultance	283, &c.	Unthinkable, is "nothing"?	395
— on motion and flow	289	Vacua, pure, are they in nature?	212
— defines action as motion	290	Vasquez, admits the possibility of an eternity of motion	429
— insists that all changes depend on local motion	296	Vibration, how produced	195
— on the production of sub- stantial forms	319	Virtue, nature and species of	42, 75
— on sacramental causality	323	— immediateness of	73, 114
— definition of free-will	381	Vital action, mechanical accord- ing to Materialists	140-1
— on the principle of impro- ductibility	394	— definition of	340, &c.
— teaches the evolution of the foetus	402-3	— in what sense spon- taneous?	341-8
— the evolution of species	407	— and immanent	349, &c.
— controversy as to his teaching with regard to an eternal world in motion	422	— accompanied by tran- sient motions	351
— on successive infinity	423	— may not be subject to resistance	363
— on simultaneous in- finity	423, 446	— proof of its exist- ence	354, &c.
— argues from contingency of matter	437	Vortex theory	201
— and from infinite series	437	— of gravitation	256
Thomists, early, on the divine co-operation	116, 117, 118	— and the original forms of matter and motion	448
— on attraction	269	Will, acts of, have a term	155
— on the immediate prin- ciple of activity	278	—see also "Free-will"	
— on free-will, their inconsistency	376	Zigliara, Card., on <i>motio-actio</i> , <i>motio-passio</i> , and operation	58, 110
— on the possibility of an infinite series	425	— proof of the divine co-operation	95
		— rebukes the Molin- ists	113
		— admits partial divine co-operation	109-113
		— on the transit of actions	186

BROWNE AND NOLAN, LTD., PRINTERS, NASSAU-STREET, DUBLIN

